

UNDERSEAWARFARE

U. S. S U B M A R I N E S... B E C A U S E S T E A L T H A T T E R S

ICEX

The Submarine Force Operates in
the Arctic in Support
of the Maritime Strategy



INSIDE

Junior Officers of the Year

Ohio-class Replacement

Diving and Salvage Support
to the Submarine Force

Women Wearing Dolphins



4



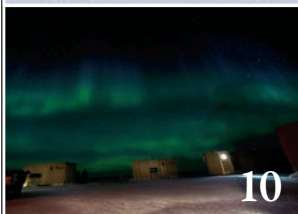
6



8



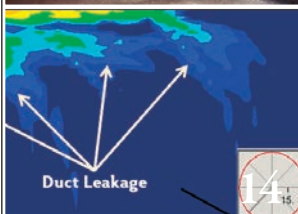
10



10



12



14



16



18



22

UNDERSEAWARFARE

THE OFFICIAL MAGAZINE OF THE U.S. SUBMARINE FORCE

ICEX

The Submarine Force Operates in the Arctic in Support of the Maritime Strategy

Features

- 4 | **The Junior Officers of the Year**
by Molly Little
- 6 | **Sea-Based Strategic Deterrent: Replacing the *Ohio*-class**
by Capt. Dave Kriete
- 8 | **2009 Ice Exercise: The Submarine Force in the Arctic**
- 8 | **The Arctic, ICEX and U.S. Maritime Strategy**
by Lt. j.g. Megan Isaac
- 10 | **Submariners Experience a New Frontier**
by Lt. j.g. Megan Isaac
- 10 | **Postcards from the Arctic**
by Jeff Gossett and Lt. j.g. Megan Isaac
- 12 | **Midshipmen Head Far North for Spring Break**
by Robert Heiler
- 14 | **Ocean Forecasting Emerges as a New Discipline with the Emphasis on ASW**
by George Lammons
- 16 | **The Office of Diving and Salvage Supporting the Submarine Force**
Interview with Capt. Patrick Keenan
by Molly Little
- 18 | **Q & A: Women Wearing Dolphins**
Three women qualified to wear dolphins share their unique stories
by Bethany Rohrer
- 22 | **The First ICEX: USS *Nautilus* (SSN-571)**
by Jason Reagle

Departments

- 1 | Enterprise Watch
- 2 | Washington Watch
- 3 | Letters to the Editor
- 28 | Downlink

UNDERSEAWARFARE is online at:
www.navy.mil/navydata/cno/n87/mag.html

On The Cover



Members of the Applied Physics Laboratory Ice Station clear ice from the hatch of the *Los Angeles*-class submarine USS *Annapolis* (SSN-760) after the sub broke through the ice while participating in Ice Exercise 2009 in the Arctic Ocean.

Photo by Petty Officer 1st Class Tiffini Jones



"On April 11, 1900, the *Holland* became the first submarine purchased by the U.S. Navy. This spring we celebrated the 109th anniversary of that event as around the world we gathered together with family and shipmates to celebrate our legacy of accomplishment."

VADM Jay Donnelly, USN, Commander, Submarine Force

On April 11, 1900, the *Holland* became the first submarine purchased by the U.S. Navy. This past spring we celebrated the 109th anniversary of that event as around the world we gathered together with family and shipmates to celebrate our legacy of accomplishment.

Today, we continue to build on the successful legacy of the Submarine Force. Our submarines are in increasingly high demand because of their proven ability to be multi-mission, cost-effective platforms needed to support U.S. National Security objectives around the globe. Often "on scene—but unseen", our submarines provide the unique capabilities that play a critical role in the broader Overseas Contingency Operations and Irregular Warfare campaign.

In addition to our operational successes, we have achieved several acquisition successes with the *Virginia* Class Submarine Program and Guided Missile Submarine (SSGN) Conversion Programs. We are meeting our challenge to reduce the cost of *Virginia* Class submarines by approximately 20%, thus enabling us to start building two SSNs per year, providing stability to the industrial base, and mitigating the decline in the number of operational submarines. We are working on designs for the *Ohio* Replacement capability to ensure there is no gap in strategic coverage when the *Ohio*-class SSBNs begin to retire. Our SSGNs have all completed conversion on time and on budget and have been delivered back to the operational Fleet. Initial assessments of their warfighting utility are impressive.

In May, we welcomed USS *Florida* (SSGN-728) home from her 13-month maiden deployment as a guided missile submarine. This was the first-ever east coast *Ohio*-class SSGN to be forward deployed. USS *Georgia* (SSGN-729) will now begin her first deployment as an SSGN, and follows a west coast deployment by USS *Michigan* (SSGN-727), as we continue delivering on the promise of unmatched Special Operations Forces and Strike capability. SSGNs are now considered the Navy's premier Irregular Warfare platform.

As I write this, our first five *Virginia* class boats begin the next chapter in adding value to our Force as we prepare to add a sixth to the fleet, *New Mexico* (SSN-779), this November. USS *Hawaii* (SSN-776) has arrived in Pearl Harbor as the first of the class to change homeports to the Pacific, with USS *Texas* (SSN-775) to follow this fall. USS *New Hampshire* (SSN-778) has returned from a EUCOM deployment where they supported the 100th anniversary of Norway's Submarine Force and USS *Virginia*

(SSN-774) is preparing for a deployment.

As we celebrate our accomplishments, we should also reflect on recent incidents and close-calls that are cause to renew our focus on what we do each day. Submariners have long exemplified the Navy's Ethos of integrity, decisive leadership, honor, discipline, and commitment to mission accomplishment. We must continue to demand the highest standards because the work we do is vitally important, and the nation relies on us every day. This is why we select and train the very best people, provide them with the most reliable and capable warships we can design and build, and hold people accountable for their actions. We will not tolerate any actions that erode the values that make us the world's best Submarine Force. Our legacy of accomplishment will only be maintained through leadership at all levels upholding a culture of excellence, professionalism, verbatim compliance, attention to detail, and learning from our successes and failures.

This issue of UNDERSEA WARFARE magazine focuses on the successful completion of Ice Exercise 2009 (ICEX 09) during which USS *Helena* (SSN-725) and USS *Annapolis* (SSN-760) demonstrated some of the unique ways our submarines support our Maritime Strategy. The concealment provided by the sea enables submarines the ability to conduct undetected and non-provocative operations, to be survivable, and to attack both land and sea targets without warning around the world. Our ability to operate in the Arctic Ocean reinforces this message and shows that submarines have the ability to operate in areas inaccessible to other forces. Recent discussions in the press have highlighted the economic importance of the Arctic and how global climate changes will increase the maritime traffic and the number of countries interested in operating in that region. Maintaining the technical and operational expertise required to safely and effectively operate in this unique environment is an important reason why we have continued to operate in this region for more than 50 years.

It remains a challenging and exciting time to be in submarines. I ask that you keep the good ideas coming and continue to display leadership with the aim to make a lasting contribution to our undersea warfighting enterprise.



"Individuals involved with this legislation inside the beltway recognize and value what submarines are doing for the United States around the world and I appreciate the efforts of all of the crews out there operating our submarines and making my job of conveying the value of submarines so rewarding!"

RADM Cecil Haney, USN, Director, Submarine Warfare



Greetings from our Nation's Capital! The pace of action here in D.C. has not slowed since the normal defense authorization and appropriation bill process started after a short legislative delay due to administration change. Traditionally spring proceedings in the legislative process have been held over to the summer and heightened the sense of urgency on moving legislation before the end of the fiscal year. Individuals involved with this legislation inside the beltway recognize and value what submarines are doing for the United States around the world and I appreciate the efforts of all of the crews out there operating our submarines and making my job of conveying the value of submarines so rewarding!

Two additional efforts are underway in parallel with the normal budget proceedings, the Quadrennial Defense Review (QDR) and the Nuclear Posture Review (NPR). The QDR analyzes strategic objectives and potential future military environments with the goal of defining force structure, modernization plans, and a budget plan that will allow the military to successfully execute the full range of missions within the National Security Strategy. In last year's National Defense Authorization Act Congress directed the Secretary of Defense, in consultation with the Secretary of Energy and Secretary of State, to conduct a comprehensive NPR to clarify US nuclear deterrence policy and strategy for the next 5-10 years. This is the first concurrent QDR and NPR since 2001 and the conclusions from both of these reviews will provide significant guidance for our future attack, guided missile, and ballistic missile submarine forces. I would like to recognize all members of our submarine community for dedicating extra effort into these important efforts and encourage them to continue to press on through their completion.

The *Virginia* program continues to set the standard in acquisition excellence. In May, we laid the keel for PCU *California* (SSN-781). The submarine is on track to deliver in June 2011, ten months early to its contract delivery date. Additionally, the final report for the Initial Operational Test and Evaluation (IOT&E) of the *Virginia* (SSN-774) class has been completed and signed. The report supports the determination that the *Virginia* class is ready for full rate production and has been found "operationally suitable, operationally effective". The last

issue reported that we had signed the contract for the next eight *Virginia* class submarines in December 2008. These Block III submarines will incorporate some significant design changes from previous blocks. One of the major changes is the switch to the *Virginia* Payload Tube (VPT) vice individual vertical launch tubes. On 12 May, the Navy took delivery of the first VPT for the first of the Block III submarines, the PCU *North Dakota* (SSN-784). Finally, on 23 July, the USS *Hawaii* (SSN-776) received a true Aloha welcome as she became the first *Virginia* class submarine to arrive in Pearl Harbor, her new homeport.

This issue features the bi-annual Arctic Ice Exercise (ICEX). The exercise featured *Annapolis* and *Helena* performing a myriad of tests, procedures and events to help our Submarine Force and nation refine and reinforce our ability to operate in the Arctic, a potential strategic focal point of the future. No other military platforms have the versatility, endurance, or ability for access required to perform in the harsh Arctic environment. ICEX represents yet another area where the unique attributes of a submarine make it an irreplaceable warfighting asset for combat commanders.

This issue also introduces a new program that has been a major focus for our D.C. team members. The Sea Based Strategic Deterrent Program will provide our nation with a platform to replace the current *Ohio*-class SSBNs as they begin retirement in 2027. In order to have this platform ready to succeed the *Ohio*-class SSBNs in providing without gap our nation's most survivable nuclear deterrence component of the triad, it is imperative that we begin the process of designing this important asset today.

For our N87 staff, I wish farewell to the following officers: RDML Paul Bushong, CAPT Moises Deltoro, CDR Drew Wannamaker, LCDR Mike Vanderbiezen, LCDR Travis Thorp, LCDR Tim Miklus, LCDR Dave Rogers, LT Ian Schillinger, LT Andrew O'Connor, and Mr. Steve Dreiss.

I would like to welcome aboard RDML(s) Richard Breckenridge, CDR Paul Savage, CDR Shane Thrailkill, and LCDR John Waterston. Finally, I want to thank all those in and out of uniform that support the Submarine Warfare Division. I know I can continue to count on your support.

Cecil D. Haney

Vice Adm. John J. Donnelly

Commander, Submarine Force
Commander, Submarine Force, Atlantic

Rear Adm. Douglas McAneny

Deputy Commander, Submarine Force
Commander, Submarine Force, U.S. Pacific Fleet

Rear Adm. Cecil D. Haney

Director, Submarine Warfare

Master Chief Petty Officer Jeff Garrison

COMSUBFOR Force Master Chief

Master Chief Petty Officer David Lynch

COMSUBPAC Force Master Chief

Cmdr. Patrick McNally

COMSUBFOR Public Affairs Officer

Lt. Cmdr. David Benham

COMSUBPAC Public Affairs Officer

Military Editor: **Lt. Cmdr. Brett Levander**

Senior Editor: **Molly Little**

Production Manager: **Robert Heiler**

Design & Layout: **Jeff Kendrick,**
Alion Science and Technology

Web Site Design: **Deepa Shukla**
Alion Science and Technology

Charter

UNDERSEA WARFARE is the professional magazine of the undersea warfare community. Its purpose is to educate its readers on undersea warfare missions and programs, with a particular focus on U.S. submarines. This journal will also draw upon the Submarine Force's rich historical legacy to instill a sense of pride and professionalism among community members and to enhance reader awareness of the increasing relevance of undersea warfare for our nation's defense.

The opinions and assertions herein are the personal views of the authors and do not necessarily reflect the official views of the U.S. Government, the Department of Defense, or the Department of the Navy.

Contributions and Feedback Welcome

Send articles, photographs (min. 300 dpi electronic), and feedback to:

Military Editor Undersea Warfare CNO N87
2000 Navy Pentagon, Washington, DC 20350-2000
E-Mail: underseawarfare@navy.mil
Phone: (703) 614-9372 Fax: (703) 695-9247

Subscriptions for sale by the Superintendent of Documents,

P.O. Box 97950, St. Louis, MO 63197
or call (866) 512-1800 or fax (202) 512-2104.
<http://bookstore.gpo.gov>
Annual cost: \$25 U.S.; \$35 Foreign

Authorization

UNDERSEA WARFARE (ISSN 1554-0146) is published quarterly from appropriated funds by authority of the Chief of Naval Operations in accordance with NPPR P-35. The Secretary of the Navy has determined that this publication is necessary in the transaction of business required by law of the Department of the Navy. Use of funds for printing this publication has been approved by the Navy Publications and Printing Policy Committee. Reproductions are encouraged with proper citation. Controlled circulation.



CHINFO Merit Award Winner



Silver Inkwell Award Winner



Send submissions to:

Military Editor

Undersea Warfare CNO N87
2000 Navy Pentagon
Washington, DC 20350-2000
or underseawarfare@navy.mil

In keeping with UNDERSEA WARFARE Magazine's charter as the Official Magazine of the U.S. Submarine Force, we welcome letters to the editor, questions relating to articles that have appeared in previous issues, and insights and "lessons learned" from the fleet.

UNDERSEA WARFARE Magazine reserves the right to edit submissions for length, clarity, and accuracy. All submissions become the property of UNDERSEA WARFARE Magazine and may be published in all media. Please include pertinent contact information with submissions.

from the EDITOR,

The following resolution honoring the historic journey of USS *Nautilus* (SSN-571) was sponsored in the House of Representatives (H. RES. 1067) by Representatives Courtney (D-CT), Skelton (D-MO), Shays (D-CT), DeLauro (D-CT), Larson (D-CT), Murphy (D-CT), Langevin (D-RI), Boddallo (D-GU), Doyle (D-PA), Brady (D-PA), Braley (D-IA), Cohen (D-TN), Bartlett (D-MD), Hirono (D-HI), Hare (D-IL), Olver (D-MA), Gonzalez (D-TX), Donnelly (D-IN), Holden (D-PA), Sestak (D-PA), and Scott (D-VA). It was sponsored in the Senate (S. RES. 648) by Senators Dodd (D-CT), Lieberman (I-CT), Reed (D-RI), and Whitehouse (D-RI). Both chambers of the 110th Congress passed the resolution. For more information on *Nautilus*, see the article "The First ICEx" on pg. 22.

Recognizing the 50th anniversary of the crossing of the North Pole by the USS Nautilus (SSN 571) and its significance in the history of both our Nation and the world.

Whereas the USS Nautilus (SSN 571), built and launched at Electric Boat in Groton, Connecticut, on January 21, 1954, was the first vessel in the world to be powered by nuclear power;

Whereas the USS Nautilus overcame extreme difficulties of navigation and maneuverability while submerged under the polar ice, and became the first vessel to cross the geographic North Pole on August 3, 1958;

Whereas the USS Nautilus, having claimed this historic milestone and returned home to Naval Submarine Base New London, continued to establish a series of naval records in her distinguished 25-year career, including being the first submarine to journey "20,000 leagues under the sea";

Whereas the USS Nautilus completed these significant and laudable achievements during a critical phase of the Cold War, providing a source of inspiration for Americans and raising the hopes of the Free World;

Whereas the USS Nautilus was the first naval vessel in peacetime to receive the Presidential Unit Citation for its meritorious efforts in crossing the North Pole;

Whereas Commander William R. Anderson of the United States Navy was awarded the Legion of Merit for his role in commanding the USS Nautilus during its historic voyage;

Whereas the USS Nautilus and its contribution to world history was praised by a range of American Presidents, including President Harry S. Truman, President Dwight D. Eisenhower, President Lyndon B. Johnson, President Jimmy Carter, and President Bill Clinton; and

Whereas President Eisenhower described the voyage to the North Pole as a "magnificent achievement" from which "the entire free world would benefit": Now, therefore, be it

Resolved, That the House of Representatives/That the Senate—

- (1) Recognizes the historic significance of the journey to the North Pole undertaken by the USS Nautilus;*
- (2) Commends the officers and crew of the USS Nautilus on the 50th anniversary of their magnificent achievement;*
- (3) Recognizes the importance of the USS Nautilus' journey to the North Pole as not only a military and scientific accomplishment, but also in confirming America's longstanding interest in this vital region of the world;*
- (4) Commends the role of the USS Nautilus and the United States Submarine Force in protecting the interests of the free world during the Cold War; and*
- (5) Supports the continuing role of the United States Submarine Force in defending our Nation in the 21st century.*

sailorsFIRST



Photo by Petty Officer 2nd Class Robert Stirrup

Friends and families wave to Sailors aboard the *Virginia*-class attack submarine USS *Hawaii* (SSN-776) as she pulls into her new homeport at Naval Station Pearl Harbor. USS *Hawaii* is the third *Virginia*-class submarine constructed and the first submarine to bear the name of the Aloha state.

Junior Officers of the Year



The Junior Officers of the Year and their spouses with Rear Adm. Cecil Haney, Director, Submarine Warfare, and his wife, Bonnie.

The opportunity to bring our spouses to the events in D.C. gave them an insight that they don't often see and was a great recognition for all the hard work they do day in and day out.

—Lt. Douglas Rosaaen

The Submarine Force Junior Officers of the Year (JOOY) represent some of the best and brightest the Submarine Force has to offer. The JOOY Program is an annual competition that gives special recognition to those junior officers of the Submarine Force, to include submarine tenders, who demonstrate superior seamanship, management, leadership, and tactical and technical knowledge. Recognition as a JOOY is based on an intense, squadron-wide competition.

The 2009 JOOYs are: Lt. Rowdy A. Garcia, USS *Norfolk* (SSN-714), Lt. William J. Howey III, USS *San Juan* (SSN-751), Lt. James E. Lysinger, USS *Maryland* (SSBN-738)(GOLD), Lt. Patrick M. McDonnell, USS *Springfield* (SSN-761), Lt. Sean M. Meredith, *New Mexico* (SSN-779), Lt. Jeffrey J. Morrison, USS *Helena* (SSN-725), Lt. Sidney W. Morrison, USS *Los Angeles* (SSN-688), Lt. Douglas W. Rosaaen, USS *Columbus* (SSN-762), Lt. Matthew W. Smith, USS *Newport News* (SSN-750), Lt. Matthew C. White, USS *Houston* (SSN-713), Lt. j. g. Jason C. Crews, USS *Georgia* (SSGN-729)(BLUE), Lt. j. g. William R. Fowler, USS *Seawolf* (SSN-21), Lt. j. g. Alexander J. Franz, USS *Ohio* (SSGN-726) (BLUE), Lt. j. g. Joshua A. Hausback, USS *Miami* (SSN-755), Lt. j. g. Nickolas Lancaster, USS *Pennsylvania* (SSBN 735) (BLUE), Lt. j. g. Michael M. Newby, USS *Emory S. Land* (AS-39), Lt. j. g. Kyle L. Woerner, USS *Chicago* (SSN-721),

and Ensign Jason S. Kneeland, USS *Frank Cable* (AS-40).

In recognition of their significant achievement, JOOY and their spouses are offered a four day experience in Washington D.C. This year's JOOY met with Adm. and Mrs. Gary Roughead, Chief of Naval Operations; Adm. Kirkland Donald, Director, Naval Reactors; Vice Adm. Jay Donnelly, Commander, Submarine Force; Vice Adm. Mark Ferguson, Chief of Naval Personnel; Rear Adm. Dave Gove, Oceanographer of the Navy; Rear Adm. Dan Holloway, Deputy Chief of Naval Personnel; and Rear Adm. Cecil Haney, Director, Submarine Warfare. They also toured the Naval Research Laboratories, the Navy Memorial, the Naval Observatory, the Navy Museum, the Smithsonian Museums, and the Pentagon, among other activities during their stay.

While in Washington, D.C., the JOOY took time to share some highlights about their experiences as JOOY with UNDERSEA WARFARE Magazine.

Ms. Little is the senior editor of UNDERSEA WARFARE Magazine.

Rear Adm. Jay DeLoach (USNR), a retired submariner and the current Director of the Naval History and Heritage Command and the Curator of the Navy, speaks to the Junior Officers of the Year prior to their tour of the Navy Museum.





Photo by Molly Little

(Above) Rear Adm. Ralph Ghormley (ret.) leads the Junior Officers of the Year on a tour of the Navy Museum on the Washington Navy Yard. (Below) The Junior Officers of the Year and their spouses with Adm. Gary Roughead, Chief of Naval Operations, and his wife, Ellen



Photo by Petty Officer 1st Class Tiffini Jones

The most enlightening part of the JOOY experience was being able to talk with the leadership of the Navy and fully understand how and why some of the most important decisions are being made. Sometimes it is hard to understand the big picture from the submarine you are operating on, but when you get together in a large group like this it is easier to see the big picture.

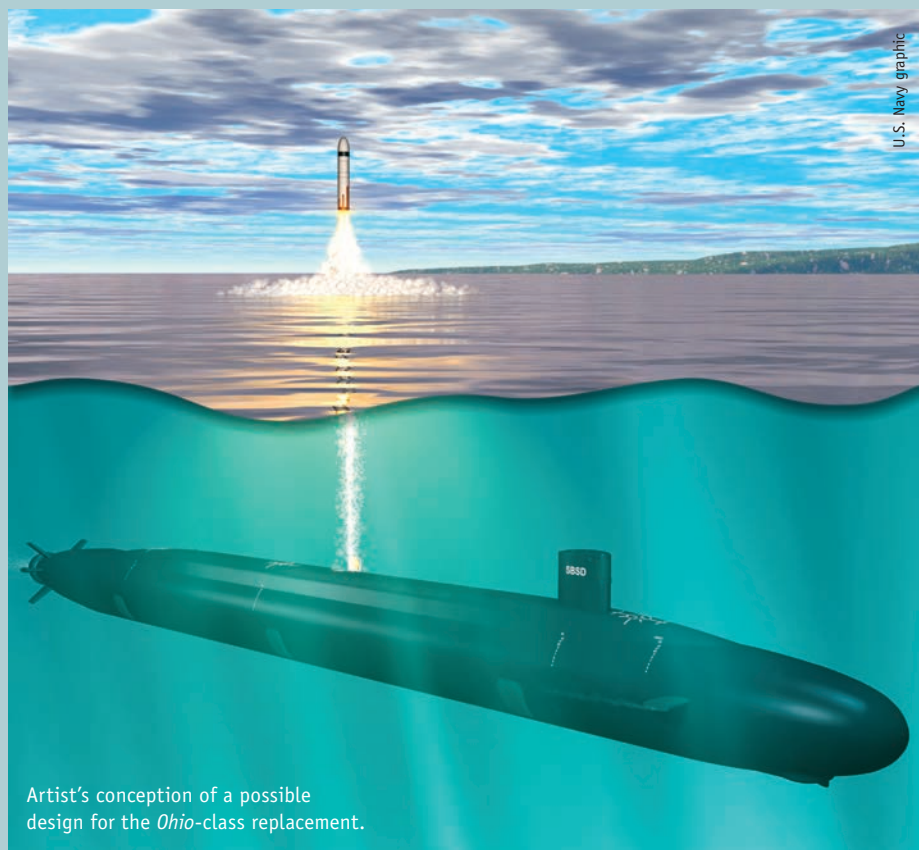
—Lt. Sean Meredith



Photo by Molly Little

We all know that being a submarine officer is a tough job. It is so easy to get caught up in the day-to-day operations onboard a submarine and lose sight of how important our job is to the security of our nation. The JOOY experience gave me a unique opportunity to see how our submarine fleet directly supports the overall operational picture in the Pentagon and other command centers worldwide.

—Lt. j.g. Jason Crews



Artist's conception of a possible design for the *Ohio*-class replacement.

Sea-Based Strategic Deterrent Replacing the *Ohio*-class

2010 will mark the first year of research and development funding for the nation's follow-on sea based strategic deterrent. In his May 14, 2009 hearing with the House Armed Services Committee, Adm. Gary Roughead, Chief of Naval Operations, stated "Our Navy supports the nation's nuclear deterrence capability with a credible and survivable fleet of 14 *Ohio*-class ballistic missile submarines. Originally designed for a 30-year service life, this class will start retiring in 2027 after over 40 years of service life. As long as we live in a world with nuclear weapons, the United States will need a reliable and survivable sea based strategic deterrent. Our FY 2010 budget requests research and development funds for the *Ohio*-class replacement, to enable the start of construction

of the first ship in FY 2019. The United States will achieve significant program benefits by aligning our efforts with those of the United Kingdom's *Vanguard* SSBN replacement program. The US and UK are finalizing a cost share agreement."

SSBNs are Required Today

In addition to Adm. Roughead, many military and political leaders over the last few decades have stated that as long as potential adversaries possess nuclear weapons the United States will need a reliable and survivable nuclear force. Since the mid 1960's, the U.S. Navy's fleet of ballistic missile submarines has met this need. As the fleet has evolved from the *Lafayette*-class to the *Benjamin Franklin*-class to the *Ohio*-class, SSBNs have remained the

most survivable and secure element of our nation's nuclear arsenal, providing the strategic deterrence that has been a core element of our national security and defense strategies which have also evolved over time. In addition, because it employs a dual crew, the *Ohio*-class SSBN gives our nation a high return on investment, only entering port for maintenance. While each leg of the nuclear triad represents a set of unique attributes, only the SSBN force provides a continuously available, secure and survivable deterrence capability, the "on-call force."

SSBNs are Required for the Future

The service the SSBN Force provides in support of our national defense strategy today represents a requirement that must be met well into the latter half of this century. A board of three and four star officers from the joint branches of our military forces validated this continued requirement last year. Further, defense leadership has affirmed the commitment to meet the requirement for a sea based strategic deterrent beyond the horizon of any of our currently in-service platforms.

Our Current Fleet of SSBNs Will Not Last Forever

The service life of *Ohio*-class SSBNs has been extended to the max possible limit. When these SSBNs retire after more than 40 years of operation, they will be the longest serving of any submarines the U.S. has ever operated.

The Time to Begin the Process of Replacing the *Ohio*-class is Today

The defense establishment has begun to examine what it will take to replace the *Ohio*-class SSBNs when the first one retires in 2027 and the remaining boats are retired at the rate of one per year through 2040. This planning is occurring at just the right time—not too soon, not too late. The eighteen years between now and 2027 represent the typical amount of time it takes to design and build a replacement class of submarines. The design and construction standard has been validated by our three most recent classes: *Ohio*, *Seawolf* and *Virginia*. But unlike the *Ohio*-class, which has an extended life of 40 years, the replacement to the *Ohio* will be designed and constructed up front initially for 40 years of operation.

Over the last year or so, much work

has been done to lay the groundwork for the *Ohio* replacement. In June 2007, Commander, United States Strategic Command wrote the Vice Chairman of the Joint Chiefs of Staff and the Chief of Naval Operations that "Allowing *Ohio*-class SSBNs and the TRIDENT Strategic Weapons System to reach end of life without replacement will create an unacceptable gap in the nation's Sea Based Strategic Deterrent (SBSD) capabilities." This letter set into motion a series of studies, assessments and reviews to define the initial set of attributes for the *Ohio* replacement. Not surprisingly, the characteristics of our next SSBN will be very similar to those of our current SSBN fleet... stealthy, survivable, persistently present, adaptable, capable... attributes that are in concert with the *Cooperative Strategy for 21st Century Seapower*.

We will have the Right Sized Strategic Deterrence Force

While the future inventory of nuclear weapons and the makeup of our future nuclear deterrent force will be shaped in the coming months as part of the Nuclear Posture Review, the need to sustain our strategic nuclear capability will remain for the foreseeable future. Even those who advocate a future world without nuclear weapons acknowledge that the path to zero simply takes time. Sustainment of our capability is necessary to prevent an unacceptable strategic posture. As long as we will need a credible nuclear deterrent capability, SSBNs will be a required element for providing that capability. By starting the research and development work this year, we will meet the nation's need to replace the *Ohio*-class SSBNs without any capability gap while preserving the ability to tailor our future nuclear force structure.

Cost Effective and Timely Development of a Survivable *Ohio* Replacement SSBN is Underway

Research and development, or R&D, is one of the first activities to take place once the concepts for the submarine are formulated. Although the initial design characteristics continue to be defined, R&D efforts must start this year so that technological and engineering needs and capabilities are matched when the heavy work of detailed design and construction begin. While the basic characteristics of the next SSBN are likely to be similar to the *Ohio*,

significant technological effort will be necessary to counter threats throughout the ship's expected lifetime through 2080. The Navy is mindful and responsive to recent Department of Defense concerns over "exquisite technology" and resulting excessive acquisition costs. Accordingly, R&D work will be confined to those areas considered essential to ensure the ship meets the country's needs. This includes the capability to operate securely in ASW environments in order to maintain the level of supremacy that today's SSBN fleet enjoys. NAVSEA [Naval Sea Systems Command] is also committed to leveraging the R&D work and acquisition cost reduction lessons that were achieved in recent years on the *Virginia*-class SSNs. In fact, all of the initial *Ohio* replacement concepts accommodate a maximum level of fleet commonality to help reduce costs throughout the submarine force, including communication suites, sonar, fire control and sensor systems. The next SSBN will provide our nation with the best possible value while getting the deterrence job done and done well.

As we study the options for how the *Ohio*-class replacement can best meet the nation's need for a sea based strategic deterrent, we are initially focusing on some of the most important attributes, like size, speed, and payload capacity. Since these steps are in the early part of the requirements process, they focus on design characteristics that will have the greatest impact on the platform's ability to execute its mission, the effectiveness of the concept of operations, the ability to adapt to changing environments and the costs associated with each. As these initial studies wrap up later this year and the program heads through its first major milestone in 2010, the focus of the work will shift from conceptual to detailed design.

Leveraging Parallel UK SSBN Development Investments will Further Enhance Affordability and U.S.-UK Strategic Cooperation

As the U.S. embarks on the path to replace our SSBN fleet, our closest ally, the United Kingdom, is undergoing planning efforts to replace their SSBN fleet of four *Vanguard*-class submarines. Our two countries are continuing a decades-old partnership in the development and design of the strategic weapon system that

will be commonly hosted by these ships. This partnership began in the 1960's with the Polaris program, continued through the TRIDENT program, and has been reinforced over the past year as we work together to develop future capability. Like our ships, the UK *Successor* class will continue to host the TRIDENT II D-5 missile when it goes to sea in the 2020's. While sharing national intellectual and engineering design resources, our collaboration with the UK will reduce the overall cost of both classes of submarines.

Maintaining a Winning Team

The number of officers, enlisted and civilians working on the *Ohio* replacement is growing steadily as we undertake this challenge. Initial R&D efforts will leverage the exceptional talent of the *Virginia*-class SSN design team. The replacement timeline capitalizes on the submarine design industrial base and the proven skills of the *Virginia*-class SSN acquisition and life-cycle cost reduction efforts.

The commanding officers of these first few ships are most likely serving at sea today as division officers in our current submarine fleet. The Sailors who man our submarines today and those who will man our submarines of the future are truly our most important asset. Without them, ships like the *Ohio* replacement will never be able to achieve the potential for which it is designed.

In February of this year, USS *Rhode Island* (SSBN-740) completed our 1000th TRIDENT patrol, a phenomenal accomplishment, earned over many years by a team of many outstanding and dedicated Americans... Sailors, designers, engineers, craftsman, and countless others who have served in or for the Submarine Force. We will build on this legacy of continuous and reliable strategic deterrence as we safeguard the future through this next class of SSBNs.

Captain Dave Kriete works at OPNAV N87 as the SBSD/*Ohio* Replacement Section Head and representative to the Nuclear Posture Review.

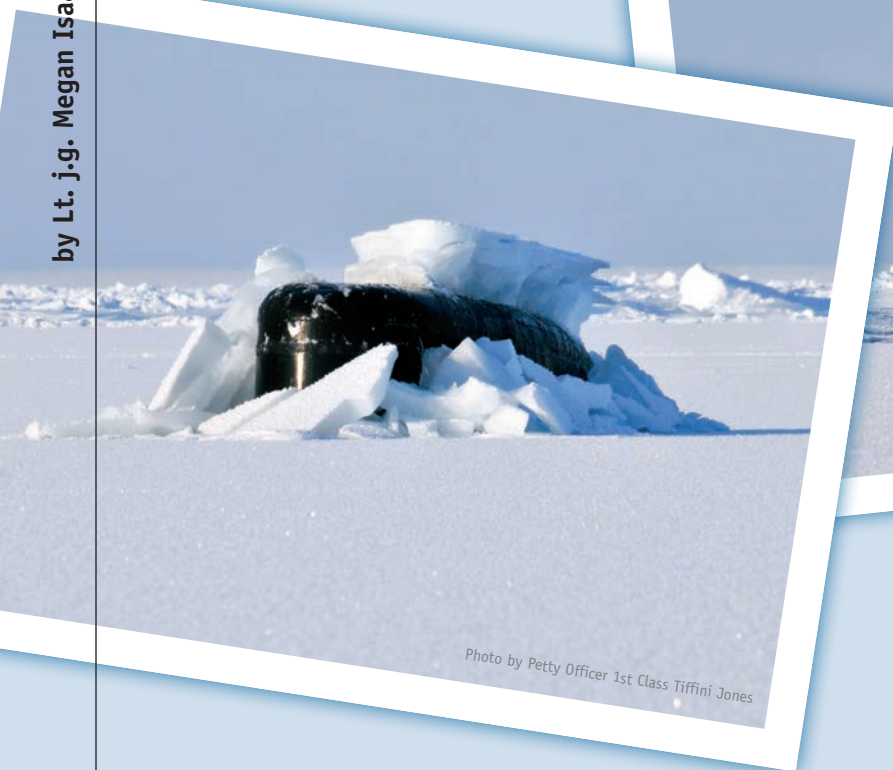


Photo by Petty Officer 1st Class Tiffini Jones



Photo by Petty Officer 1st Class Tiffini Jones

The Arctic, ICEX and U.S. Maritime Strategy

In 1958, USS *Nautilus* (SSN-571) made history when it completed the first submerged trans-polar crossing and forever changed the nature of submarine operations in the Arctic Ocean. U.S. Navy diesel submarines had been conducting short excursions into the marginal ice zone (MIZ) since the early 1940s, but with the advent of unlimited range and endurance offered by nuclear propulsion, a new era began.

The Arctic Ocean is one of the most strategically important areas for current and future military leaders and policy makers. The ocean borders on multiple nations and serves as an important waterway that connects the Atlantic and Pacific Oceans. The capability to operate in the Arctic Ocean at any time of year and under any environmental conditions is vital to our national interests and provides the United States with assured access to all the world's maritime operating areas.

"The Arctic is important to the nation and the Navy because it really is a maritime domain," said Admiral Gary Roughead, Chief of Naval Operations [CNO]. "We

have some very fundamental security interests in the Arctic regions."

Operating in the Arctic is unlike any other maritime operation due to the extreme, harsh, and unforgiving conditions of the environment. The majority of the Arctic Ocean is covered in thick pack ice during most of the year, making it inaccessible to surface ships. As such, the U.S. Submarine Force has taken the responsibility to maintain proficiency in Arctic operations.

In addition to extremely low temperatures, the constant freezing, melting and re-freezing of the ice make salinity and density of Arctic water drastically different from that of any other ocean. Every aspect of the Arctic Ocean presents a different challenge for submarines operating under the ice, and maintaining a high degree of skill requires constant training and testing in the environment.

"Routine" operations are much more complex under the ice. Varying water density makes it difficult to maintain neutral buoyancy under the ocean and requires

the ship control teams to be vigilant in maintaining the trim and ballast of the submarine. The overhead ice canopy, with ice keels that can reach as deep as 200-feet, adds another layer of operational complexity that submarines do not routinely encounter. Additionally, salinity differences throughout the Arctic Ocean present challenges to even the most experienced sonar operators. Underwater mapping, torpedo exercises, contact tracking, and almost all other sonar functions are affected by the unique and varied sound velocity profiles encountered in this unpredictable environment.

In 2009, the Submarine Force and the Arctic Submarine Lab (ASL) conducted the most recent Ice Exercise (ICEX). ASL is the Navy command that specializes in Arctic operations for submarines. Every two years ASL and Applied Physics Laboratory at the University of Washington (APL-UW), under the command of Commander, Submarine Force (COMSUBFOR), set up an ice camp on the pack ice to support ICEX. APL-UW provides field engineers



Photo by Petty Officer 1st Class Tiffini Jones

The photo sequence at left shows USS *Annapolis* (SSN-760) breaking through the ice during ICEX 2009 to disembark Sailors and embark VIP visitors. (Below) Pictured, left to right: Capt. David Kirk, Office of Legislative Affairs; Representative John McHugh (R-NY, now Secretary of the Army); Representative Todd Akin (R-MO); Adm. Gary Roughead, Chief of Naval Operations; Senator Kay Hagan (D-NC); Rear Adm. Douglas McAneny, Commander, Submarine Force, U.S. Pacific Fleet; Representative Jack Kingston (R-GA); Mr. Alcides Ortiz, SECNAV Special Advisor; Mr. Erik Raven, professional staff member for the Senate Appropriations Committee on Defense; Ms. Jenness Simler, professional staff member for the House Armed Services Seapower Sub-committee.



Photo by Petty Officer 1st Class Tiffini Jones

to support every aspect of logistics at the camp—from building the camp, to providing and cooking food, to the recovery of any torpedoes fired by the submarines.

While initially a small and modest undertaking, the ICEX program has evolved into the development, testing, and certification of highly specialized tactics, techniques, and procedures designed to optimize the Submarine Force's performance in under-ice operations.

"ICEX is important to our maritime strategy because it really allows us to better understand and operate in all areas of the world," said Roughead while onboard USS *Annapolis* (SSN-760) during ICEX. "We, as a Navy, are a forward deployed navy, we're a global Navy; we're a Navy that exercises sea control and power projection, and if we are a global Navy, we have to be able to do it everywhere."

The *Los Angeles*-class fast attack submarines *Annapolis* and USS *Helena* (SSN-725), home ported in Groton, Conn. and San Diego, Calif. respectively, were the two submarines that participated in ICEX. The event took place approximately 200 nautical miles north of Prudhoe Bay, Alaska. All operations during ICEX were conducted within a portable tracking range closely monitored by personnel at the ice camp, who assisted in data gathering and analysis of the exercises conducted by the two sub-

marines.

"ICEX provides for the Navy an opportunity to test our combat systems, our navigation systems, our communication systems, and just what it's like to operate in this very, very challenging environment," said Roughead. "By coming up here, by being part of not just a Navy initiative, but a broader scientific initiative, it really helps out not just the Navy but other communities as well."

The officer in tactical command for ICEX was Capt. Greg Ott, currently the Deputy Director for Operations at COMSUBFOR. Capt. Ott was in charge of the overall camp operation, the operations of the two submarines, and the logistics group in Prudhoe Bay during the exercise.

"Submarines are the only ships in the U.S. Navy that have historically operated in the Arctic on a regular basis," said Ott, "There's a homeland security aspect to the ICEX since there are other countries that operate up here. Also, if the ice retreats, it could be a vital sea lane of communication; it's important for us to make sure our interests are protected."

Annapolis and *Helena*, under direction of Capt. Ott, practiced surfacing through the pack ice. Twelve Sailors from the crew also had the chance to spend a night ashore and experience life at the remote ice camp. For

Adm. Roughead it was a great opportunity to see the submarine operating under the ice and the skill and expertise required to ensure the exercises are properly executed.

"The submarine fleet has been doing this for a long time," said Ott, "So we understand what the difficulties are. By expanding our experience through events like this one, we better understand what the boats need to be able to do and ensure they are trained and equipped to operate in the Arctic."

After two weeks of testing, the submarines submerged below the ice for a final time and headed toward home. Meanwhile, remaining personnel tore down every scrap of the ice camp and flew it back to the mainland, leaving the ice the way it was found.

The knowledge about the dynamic nature of the Arctic Ocean gained during ICEX will be shared with the rest of the Navy and will be used to ensure that U.S. Naval forces continue to exercise operational excellence in the Arctic now and for the foreseeable future.

Lt. j.g. Megan Isaac works in the public affairs office for the Commander, Submarine Force.

Submariners Experience a New Frontier

While information gathered by ICEX will benefit the entire Navy, it is uniquely important to the submarine force. The stated goal of ICEX was for the USS *Helena* (SSN-725) and USS *Annapolis* (SSN-760) to evaluate tactics, techniques, and procedures specifically developed for operations in the Arctic. However, it was the experience of being there that mattered the most to the Sailors.

"Not too many platforms can go where we can go," said Chief Petty Officer Phillip Adams, navigation chief onboard *Annapolis*. "The awareness we accumulate is shared so other military forces can learn from what we have done. Every time we come up here, we get better at operating up here."

"The only two types of boats that can operate in the arctic right now are ice

crushers and submarines," said Petty Officer 1st Class Amalio Gamboa, from *Helena*.

"It's about assured access," said Cmdr. Daniel Brunk, *Helena's* commanding officer. "We can go anywhere we want."

Helena surfaced March 27 in an open channel in an ice field, within a few miles of the Applied Physics Laboratory Ice Station camp. The camp was set up on a small piece of the Arctic pack ice and supported all of the evolutions during ICEX. After mooring on the ice, Brunk, along with a few members of *Helena's* crew, were able to disembark the submarine and spent some time at the camp and the 50 degrees below zero temperatures.

Before arriving on station to participate in ICEX, *Helena* transited through the Bering Strait. "The Bering Strait is tough because there [is] only 25 feet of water below you, and at times, ice keels hang down low enough to force you to maneuver the submarine," said Brunk.

"For a sonar technician, ICEX is very intense as far as ice keel

avoidance and using sonar is concerned," said Petty Officer 2nd Class Andrew Reyes, stationed onboard *Annapolis*. When under the ice, the submarines must use upward-looking sonar to create a picture of what the ice looks like. This picture is necessary in the Arctic as ice keels can extend deep below the surface of the ocean and create an obstacle for the submarine. Reyes, along with the rest of the *Annapolis* sonar team, trained with new equipment and then had their skills tested in this challenging environment.

"Operating in the Arctic makes everyone work at 100%," said Petty Officer 3rd Class Jonathan Bong, onboard *Helena*. Even small, unexpected buoyancy changes can have significant effect when operating in an environment where ice keels are common and the ceiling is covered by several feet of ice. Sailors on *Annapolis* and *Helena*, or any submarine operating under the ice, must be incredibly precise in under-ice maneuvering to avoid the ice keels.

For Master Chief Petty Officer Christopher Gillen, operating in the Arctic is an exciting but difficult experience. "Surfacing the ship is totally different; we

Postcards from the Arctic

by Jeff Gossett and Lt. j.g. Megan Isaac

17 March 2009

Greetings from APLIS. USS *Annapolis* (SSN-760) arrived today—a day early. After making sure that their tracking range system worked properly, we gave her the coordinates of a large expanse of thin ice about a mile southwest of camp. The helo shuttled several groups of camp residents down to the site (that we call "Marvin Gardens") to watch *Annapolis* surface. Capt. Brunner [commanding officer of *Annapolis*] took the helo back to camp, giving him an opportunity to see what the surrounding ice looked like and how we on the surface are living.

Later in the evening, *Annapolis* dove and we are able to start the testing 24 hours ahead of schedule.

Our first set of camp visitors arrived this morning—Lt. John Woods, an Oceanography professor from the U.S. Naval Academy along with two students, Midshipman Julie Barca (the Brigade Commander) and Midshipman Leah Jordan. They are here to experience a unique aspect of Naval Operations and to get a first-hand look at Arctic Oceanography.



Photo by Petty Officer 1st Class Tiffini Jones

(Top to bottom) A crewmember of USS *Annapolis* (SSN-760) drives under the Arctic ice; a view of the camp from above; camp members wait to assist the divers out of the water with the recovered torpedo.



Photo by Petty Officer 1st Class Tiffini Jones

have to do a vertical surfacing as opposed to our usual surfacing,” said Gillen. “Also, you can really feel the difference in how the water holds the sub; the salinity makes it hard to maintain a depth, and you have to be on it all the time.”

ICEX was the first time in the Arctic for many of the Sailors. “Only a handful of people compared to the population of the planet can actually say they have been to the Arctic Circle,” said Petty Officer 2nd Class Paul Scharf, a member of the engineering department onboard *Annapolis*. “Even fewer can say they’ve been underneath it and broken through the ice on a submarine. That is something very cool that we get to do.”

Unlike other areas where experience brings mastery of the operating environment, the Arctic is continuously full of new challenges. “Something that really surprised me about the Arctic Ocean is how it’s constantly changing,” said Brunk. “A lot of people think it’s just a static chunk of ice, but the ice is always moving. One day something will be solid ice and the next it’s open water.”

For the Sailors of *Helena* and *Annapolis*, ICEX offered training in a new type of

undersea warfare. “I enjoy being in an environment that’s so different,” said *Annapolis* Chief Petty Officer Tomas Garcia, Chief of the Boat. “It’s challenging, it shows off my crew and what we’re capable of, how we can handle the ship with precision and demonstrate our expertise.”

Let there be no doubt, the strategic significance of submarine operations in the Arctic is not lost on the crews of these two boats. “The biggest take-away is that we truly are a global navy,” said Garcia, “Our Navy has the globe covered, operating on the sea, air, or land in all parts of the globe, even in as extreme environments as the North Pole.”

Lt. j.g. Megan Isaac is a public affairs office for the Commander, Submarine Force.



Photo by Petty Officer 1st Class Tiffini Jones

The camp’s helicopter removes a torpedo from below the ice.

19 March 2009

Greetings from APLIS. USS *Helena* (SSN-725) arrived during the pre-dawn hours this morning. In order to get here from San Diego, *Helena* came through the Bering Strait. This involved a 900 nm transit through shallow water, all of it covered with ice, sometimes requiring almost constant maneuvers to avoid threatening ice. With really shallow water, even small ice keels can pose a hazard to the submarine.

The first thing on *Helena*’s agenda was the same as for *Annapolis*—making sure the tracking range system and the ACOMMS [Digital Acoustic Communications System] were working. This assured us that we could track both submarines at the same time and communicate with them while we conducted our testing.

So what are we testing? I’ve already mentioned the ACOMMS tests and the ice avoidance sonar testing that we’ve had *Annapolis* working on. But our highest priority test is evaluating the effectiveness of our torpedoes in an under-ice environment. In order to accomplish this, both submarines have been loaded out with several exercise torpedoes and they will take turns launching these at each other. The results will enable us to determine how our torpedoes work in the Arctic sonar conditions and what we can do to improve them.

We got the first shot off early this afternoon. After the torpedo finished running, it bobbed up to the bottom side of the ice about two nautical miles (nm) west of camp. Obviously, we aren’t going to leave it there so we needed to retrieve it. This involves a complex process developed over decades of Arctic torpedo exercises.

First we had to find the torpedo. Our tracking range helped us pinpoint its location to within about 50 yards. Travis Major led a team out into the field that used underwater acoustic and video sensors to locate the torpedoes precise position. Next, the helo delivered a melter to the site that was used to melt two 3-foot diameter holes through the five feet of ice.

Now the fun part. Two divers donned dry suits and hopped in the water through one hole then gently moved the torpedo to the other hole. There it was harnessed and lifted out of the hole by the helicopter. After a little loving care back here at the camp, it will be flown back to Prudhoe Bay tomorrow and readied for shipment back to one of our torpedo maintenance facilities.



Photo by Petty Officer 1st Class Tiffini Jones



Photo by Lt. John Woods

U.S. Naval Academy Midshipmen Head Far North for Spring Break

For most students in the last year of undergraduate studies, Spring Break is supposed to be a trip to Daytona, San Diego or Myrtle Beach: a lot of warm sun, smooth sand and endless sea.

Two members of the Naval Academy's Class of 2009 had to settle for just one out of three.

For Julie Barca of Lower Burrell, Pa., and Leah Jordan of Weston, Wis., a large percentage of the endless sea that they saw during Spring Break was frozen solid. The two oceanography majors left Annapolis on March 13, 2009, to spend the spring break at a temporary ice camp built on the Arctic Ocean during Ice Exercise (ICEX) 2009 off the north coast of Alaska. They were accompanied by Naval Academy oceanography instructor Lt. John Woods. ICEX

21 March 2009

Greetings from APLIS. An extremely busy day today. We've shot and recovered two more torpedoes, handled six flights of passengers & cargo, entertained our guests, kept a small village running, and hosted a party of VIPs from Washington. This party included: Adm. Gary Roughead, Chief of Naval Operations; Rear Adm. Douglas McAneny, Commander, Submarine Force, U.S. Pacific Fleet; Senator Kay Hagan (D-NC); Representative John McHugh (R-NY, now Secretary of the Army); Representative Jack Kingston (R-GA); and Representative Todd Akin (R-MO).

This morning, *Annapolis* surfaced for the second time. Though the submarines will be making several surfacings while here at the camp, the amount of work by members of the camp and precise shiphandling by the submarine crews should not go unnoticed. The submarine cannot surface right next to the camp as the ice is not predictable, and the force of the submarine breaking through could open up a lead that could spread for a long distance, possibly destabilizing the ice camp. Therefore, to protect the camp, the submarine surfaces at least a mile or more away.

Everything and everyone that goes from the camp to the surfacing site must be transported via helicopter. It's easy to see how quickly an evolution like this can become an all-day event. A "Marvin Gardens Team" marks the surfacing spot and stays in touch with the camp and the boat, while a warming hut, a brow, and a sled full of chainsaws are only a few of the items that need to get out to the site. After the camp personnel have established the site and the surfacing time with the boat, anyone who wants to watch the surfacing must also be transported, six at a time, to the site. After hours of preparation, the surfacing itself takes less than a minute! And what a breathtaking minute it is.

After the surfacing is complete, the forward hatch on the submarine has to be cut out of the ice with a chainsaw, a few shovels, and a lot of hard working individuals.



Photo by Petty Officer 1st Class Tiffini Jones

offered the first class midshipmen a once in a lifetime chance for hands on application of their academic studies as well as chance to board *Annapolis* while she was surfaced.

For Jordan, the unique environment of the Arctic Ocean brought her senior project to life. Her research is focused on the relationship between plate tectonics and tsunami generation — and the under-ice environment gave her a new perspective.

“The interaction between the ice floes,” Jordan said, “The way it collided and formed ridges, or broke apart, visually illustrated what I was studying.”

The motion of that ice and its relation to air temperatures was the main focus of Barca’s research. The opportunity to go to ice camp changed her perspective on that research as well.

“It gave me great hands-on experience to see the information that I was gathering from books actually being applied in real research environments,” Barca said. “Everything that I had been studying really came to life when I was actually walking on the ice.”

In addition to the surroundings, both midshipmen were inspired by the teamwork and organization of the people

they got to work with.

“I definitely gained a significant amount of appreciation for the work that goes into coordinating the exercises,” Barca said. “The people were incredible. Everyone was intelligent and interesting, and they really made the trip worthwhile.”

Jordan added, “Everyone had something to contribute to the functioning and success of ICEX and that impressed me. It really solidified the idea that we’re all working toward one goal, in one fight.”

Lt. Woods, their instructor, said he was surprised by the nature of the cold.

“It was pretty consistently 40 below wind chill, but it is amazing how 40 below feels during the day compared to the nighttime,” Woods said. “What is somewhat bearable for short periods of time during the day, is nowhere close to being bearable at night.”

But for Jordan, braving that nighttime chill had its rewards. She was struck by “how alien and beautiful the landscape really is, particularly at night.

“When the wind had finally calmed and the air settled around 20 to 30 degrees



Photo by Lt. John Woods

(Opposite) Midshipman Julie Barca, Lt. John Woods and Midshipman Leah Jordan pose with the Naval Academy Flag in front of USS *Annapolis* (SSN-760). (Above) USS *Annapolis* (SSN-760) on the surface at sunset.

below, I ventured out and saw the sky as I had never seen it before” she said. “Bright, countless stars everywhere and the shape-shifting light show of the Aurora Borealis.

“That sight is something I will never forget.”

Mr. Heiler is the production manager for UNDERSEA WARFARE Magazine.



(Left) Adm. Kirkland Donald, Director, Naval Nuclear Propulsion; Secretary of Energy Steven Chu; Representative Rodney Frelinghuysen (R-NJ); Representative Lincoln Davis (D-TN); Representative Christopher Carney (D-PA); and Representative David Roe (R-TN) pose with other camp members. (Below) The aurora borealis at night over the camp.



Photo by Petty Officer 1st Class Tiffini Jones

28 March 2009

Greetings from APLIS. We completed our last torpedo test this morning — two days ahead of schedule. A lot of people spent a lot of hours in the field searching for and recovering the torpedoes after they were launched.

This is the last day of testing for *Helena*. She surfaced again to debark the people riding to support camp testing and embarked two additional ASL riders to assist with the southbound transit of the Bering Strait. The fantastic crew of *Helena* is now headed home to San Diego.

Annapolis also surfaced, not only to debark many of her riders but also to embark our second group of weekend VIPs. Escorted by Adm. Kirkland Donald, Director, Naval Nuclear Propulsion, this party included Secretary of Energy Steven Chu, Representative Rodney Frelinghuysen (R-NJ), Representative Lincoln Davis (D-TN), Representative Christopher Carney (D-PA) and Representative David Roe (R-TN).

Ocean Forecasting Emerges as a New Discipline with the Emphasis on ASW

New developments in ocean forecasting at the Naval Oceanographic Office (NAVOCEANO) are revolutionizing the way warfighters look at oceanography and how it enhances their ability to conduct Anti-Submarine Warfare (ASW).

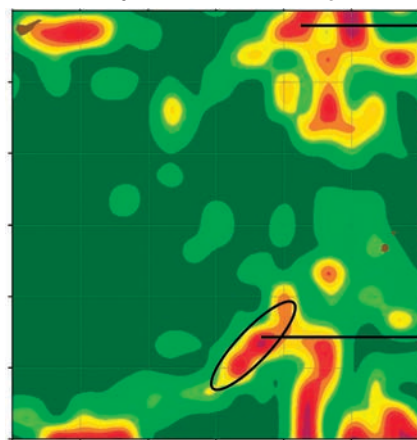
The newly-established Ocean Forecast Group now forecasts ocean conditions in much the same way meteorologists forecast atmospheric conditions – a discipline the team developed from scratch.

“We have built a capability from ground zero—developing procedures, tools and methods based on our experience probing the ocean and collecting data from it,” said Capt. Jim Berdeguez, NAVOCEANO commanding officer.

The culmination of this data yields an ocean forecast that ultimately provides commanders with enhanced means to make tactical decisions. As varying ocean conditions affect the way acoustic sensors perform, the forecasters predict those conditions and describe the impact on acoustics in a particular setting.

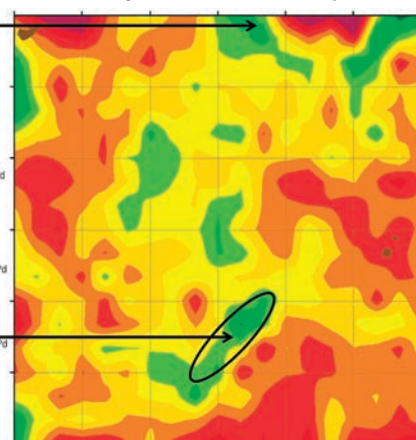
“Ocean forecasters provide integral support to ASW by taking model output and turning it into tactically relevant information that helps warfighters decide where and how to best use their sensors,” said Cmdr. Tony Miller, commanding officer of the Naval Oceanography Anti-Submarine Warfare Center at NAVOCEANO.

Probability of Detection averaged over 30 kyds vs. a threat at 150 ft



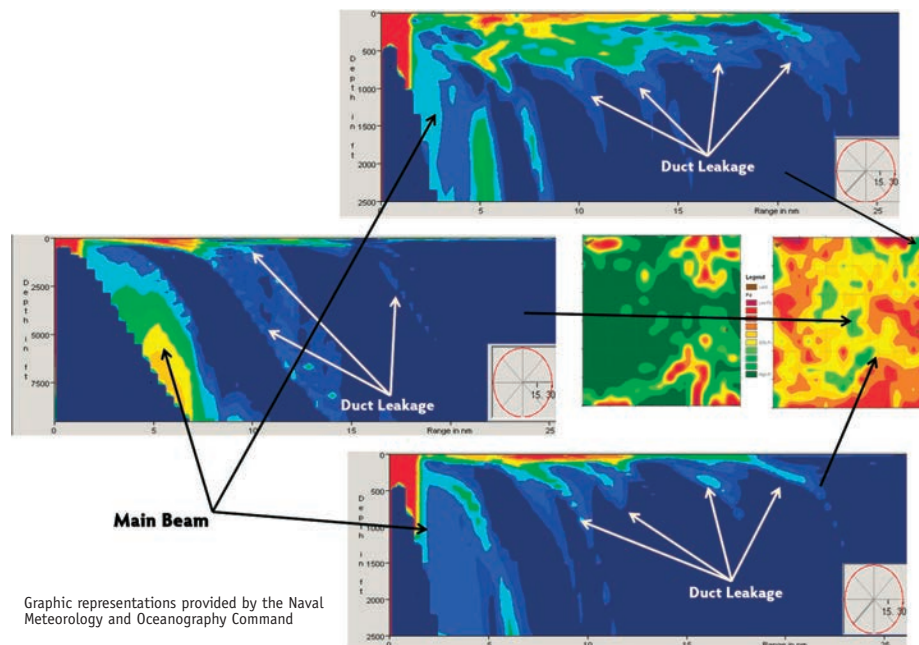
Probability of detecting a target somewhere between the sensor and a range of 30 kyds distant when the target is in the surface duct (maximum depth ~400 ft).

Probability of Detection averaged over 20 kyds vs. a threat at 510 ft



Probability of detecting a threat somewhere between the sensor and a range of 20 kyds distant when the target is at an operating depth below the surface duct.

NOTE: “Good” performance against a deep target occurs on the deep-duct side of the poor performance shallow-duct areas (Gridlines included for reference purposes only).



Graphic representations provided by the Naval Meteorology and Oceanography Command

Full-field plots of duct leakage leading to below-duct detection potential. Areas where the duct shallows are directly linked to areas where there is significant energy below duct due to duct leakage.

The Ocean Forecast Group was established to enhance the growing ASW activities of the Naval Meteorology and Oceanography Command (NMOC). The Navy uses a variety of tools to discern acoustic performance: ocean data from several sources, numerical ocean models, acoustic models—and now ocean forecasters, who provide additional analysis as weather forecasters provide analysis to weather models and atmospheric data.

By analyzing how ocean variables affect sound speed and sonar performance, the

ocean forecasters verify where data and the resulting models work, and how to weigh the data in a particular operational area.

“They are the ones who are analyzing and adding real value to the model output,” said Berdeguez.

Jay Wallmark, Ocean Forecast Team Leader, added: “We are able to filter out all the irrelevant data, based on the oceanography of a particular area and the way sensors work.”

NAVOCEANO has long used models and data graphics that show general ocean

Ocean forecasters provide integral support to ASW by taking model output and turning it into tactically relevant information that helps warfighters decide where and how to best use their sensors.

conditions, but oceanographers in the field typically did not have the time or scientific expertise to apply the degree of analysis in the field to support the operational commanders at this level. NMOC realigned to warfighting missions in 2004 and instituted a concept of operations that relies on reachback to operational production centers for products that incorporate this higher level of analysis and application to warfare decision-making. Military oceanographers at key decision nodes then use these products to advise and facilitate warfighting decisions based on the operational situation.

"We do the analysis here at NAVOCEANO, where we have all of the data and knowledge, then send it forward. We are the experts," Wallmark said. "When we release our product, the forward guy can immediately turn around and brief the commander. It saves them the time it would take to generate a less accurate ocean forecast."

Because less is known about ocean science than atmospheric science, ocean forecasting is still a developing discipline.

"Overall, ocean forecasters have less experience than weather forecasters. There are a lot more unknowns in forecasting the ocean," said John Blaha, technical lead for the Ocean Forecast Group. "The goal is that ocean forecasters will one day be as proficient at forecasting in their environment as meteorologists are at forecasting atmospheric conditions."

In the four years since its inception, Capt. Berdeguez says the group has proved its value and is "extremely important" to the Navy's ASW operations.

The Ocean Forecast Group has a strict operational focus, the vast majority of which is ASW-related. To stay prepared, the forecasters daily monitor locations with high ASW activity or with the potential for such. Wallmark said that by monitoring potential hotspots they are nimble enough to respond to requests for products and

analysis at any time.

Said Blaha: "We're a conduit that helps the Fleet to see farther and shoot better."

He described how operational ocean forecasters are able to provide this service with such proficiency.

First, the ocean forecasters know the limits of the models and the capabilities of the observation system. The models use a variety of data collection systems—satellites, ships at sea, historical data, expendable probes, towed arrays and more—and the ocean forecasters know some data sources can be more dependable than others.

Second, the forecasters possess intimate knowledge of the particular area of the ocean they are forecasting, and the characteristics like currents and eddies, depth, water temperature range and variability, bottom profile, etc. A naval operation could potentially occur in any part of the world, so the forecasting team must know the unique character of almost every part of the oceans.

Third, they know how to tailor their products based on the operational application. For example, the differing parameters between ASW and mine warfare call for ocean forecasters to know which factors are pertinent for each type of operational application.

The vast amount of knowledge required to generate their products means that the Ocean Forecast Group must behave in complete cohesion.

"There are no loners here," Blaha said. "It is a true integrated, multi-disciplinary process."

Wallmark said that the new discipline of ocean forecasting and the reinvigoration of oceanography in the Navy makes for exciting times to be a professional oceanographer. Researchers are working to make the models more dependable and finer scale, and operational oceanographers and acousticians are learning more about the ocean as they monitor and analyze conditions.

But the reason for the advancements and

improvements—and the new discipline of ocean forecasting—remains ASW today.

"We try to find out what's going on in the ocean and how it applies to ASW," Wallmark said. "It's important that it be tactically focused."

NMOC provides tactical, operational and strategic support to all five Warfare Enterprises. The Naval Oceanography Program consists of the operationally-applied sciences of oceanography, meteorology, hydrography, and precise time and astrometry.

The Ocean Forecast Group is a prime example of NMOC's larger strategy, called Battlespace On Demand (BonD). BonD is the process by which NMOC translates its knowledge of the current and predicted physical environment—its inherent variability and its impact on sensors, platforms and people—into warfighting decision-making.

Lt. Cmdr. Neil Smith, an oceanographer previously assigned to the Forward Deployed Naval Forces at CTF 74, tested the implementation of ocean models and analytical tools that are now a reality for warfighters around the world. "One of the first lessons we learned in a major exercise utilizing these new forecasting tools was the dynamic nature of ASW conditions and the value of accurate acoustic models." He recalls that task force commanders immediately saw the value in these new products. The ability to accurately predict future conditions provides an effective tool for planning ASW missions.

Mr. Lammons works in the Public Affairs Office at the Naval Meteorology and Oceanography Command. He is a graduate of the University of Tennessee and Millsaps College. His articles have appeared in a variety of Navy, technical, professional and general interest publications.



Diving and Salvage Support Submarine Force



Photo by John Narewski

Since its inception, the Submarine Force has received support from the Office of the Navy Supervisor of Diving and Salvage and Director of Ocean Engineering. As mission platforms and capabilities increase, the support needed from the authorities on diving and salvage increases as well.

Capt. Patrick Keenan, a Princeton, N.J. native, is currently serving as the U.S. Navy Director of Ocean Engineering, Supervisor of Salvage and Diving. Capt. Keenan is an Engineering Duty Officer with marine salvage, drydocking, and ship repair experience. He is qualified in air, mixed gas, and saturation diving systems and as a docking officer for both floating and graving drydocks. Capt. Keenan has served in engineering and deck/salvage capacities aboard ATF and ARS class salvage ships and as the Seventh Fleet Salvage Officer. He is a registered professional engineer and marine surveyor. His research related to waterborne ship repair was published in the Naval Engineers Journal. He holds a U.S. patent for his invention *Method and Apparatus for Thermal Insulation of Wet Shielded Metal Arc Welds*, and he was the 2000 American Society of Naval Engineers Claude A. Jones Award winner for excellence in the field of Naval Engineering.

Earlier this year, Capt. Keenan provided UNDERSEA WARFARE Magazine with details on the ways his office provides support to the Submarine Force and how the support is growing as the capabilities within the Fleet grow:

"The Office of the Navy Supervisor of

Diving and Salvage and Director of Ocean Engineering is the Navy's technical authority for salvage, marine pollution control, diving, diving systems certification, ocean search and recovery, and underwater ship husbandry. First, salvage and marine pollution control are what we call 'national missions.' National missions go directly to federal law. Title 10 of U.S. Code of Federal Regulations stipulates that the Secretary of the Navy will provide facilities for salvage of public and private vessels. It further defines salvage to include protecting the environment, because normally when you have some problem with a ship, whether that ship is a tanker or not, there is fuel involved. Diving is one of the tools we use for salvage, but diving is also used in many other areas within the Navy. Historically, my office has been responsible for salvage and diving, but more recently we have become the technical authority for diving as it relates to anything the Navy does. In addition to salvage diving and underwater construction work, we work with special warfare and EOD [explosive ordinance disposal] communities to make sure they will have the tools and the procedures they need to do their jobs.

The diving life support systems that are fielded through this office, whether by contract or by Navy operators and developers directly, need to be operated and maintained in a safe manner. The Diving Life Support System Certification Branch, which is part of this office, ensures that they are. They do that not just for the Navy, but for the Marine Corps, Air Force, Army and other

organizations with the DoD [Department of Defense], even the Homeland Security Department. And it makes sense for all the diving communities to be supported by one office vice each DoD department funding identical organizations.

Deep Ocean Recovery, another element of my office, is a specialized part of salvage. Sometimes components of interest are lost in water too deep for human recovery. So we maintain a government owned, contractor operated, suite of systems that can do search and rescue in up to 20,000 feet of sea water. This covers the majority of what is out there. For example, we were recently able to recover part of a B52 for the Air Force and a helicopter for the Coast Guard that would have been otherwise unrecoverable.

The last area, the part that affects the Submarine Force, is underwater ship husbandry or working on ships and submarines while they are water borne. This includes emergent work or maintenance work that is done to keep a ship or submarine operational. We can do propeller change outs, work inside ballast tanks, patching ballast tanks, SPM-SPU [Secondary Propulsion Motor-Secondary Propulsion Unit] change outs, work on sensors, retractable bow plane work, etc. There is a myriad of work that we can do on submarines. If we can figure out how to replace or repair the submarine in the water, we don't have to dock the boat. That is important because docking assets are expensive, time consuming, and limited. We estimate that while the work would

When you complete the work in the water, you don't need to pay the costs associated with drydocking or more importantly, place extra work on the Sailors.

In an average year, we avoid about 33 submarine drydockings by completing work in the water.

cost about the same in the water as at the drydock, the actual cost of drydocking a submarine for one week (including setting up the drydock and submarine for the work to be done) is significant. When you complete the work in the water, you don't need to pay the costs associated with drydocking or more importantly, place extra work on the Sailors. In an average year, we avoid about 33 submarine drydockings by completing work in the water.

To maximize the advantages from in water repairs, our underwater ship husbandry group is continually developing and refining existing procedures to complete work in the water. The group works with diving personnel to develop procedures and equipment to make the underwater ship husbandry personnel more effective in the water. My office develops the procedures, and then goes out in the field to manage the procedures and maintain necessary equipment with Fleet dive lockers. It is a combined NAVSEA-Fleet effort; however, my office is responsible for maintaining the equipment and ensuring it is in a "ready to use" status.

The *Virginia*-class and SSGNs are relatively new and force us to



Photo by Nicole Martin



Photo by John Nardone

(Opposite) Petty Officer 3rd Class Kurt Eberle waits for a tool bag before he begins a dive project in support of the fast attack submarine USS *Miami* (SSN-755). (Top) Capt. Patrick Keenan, Director of Ocean Engineering, Supervisor of Salvage and Diving discusses the support his office provides to the Submarine Force. (Bottom) Petty Officer 3rd Class John Seagraves gets ready to start his dive off the back of the dive boat. Seagraves is part of Naval Submarine Support Facility dive locker.

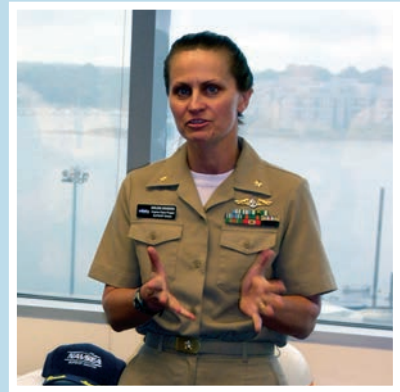
continually develop and assess procedures to support the maintenance of these new submarines. Our goal is to provide maintenance and support for both old and new submarines to keep them out of drydock as much as possible. The other aspect of these new submarines that we support is submerged diver deployment and recovery. My office is the center of expertise for this new, exciting capability.

Although the technical authority and a significant amount of technical expertise about diving and salvage resides in this office, the real work gets done out in the Fleet. The SEAL teams, the EOD personnel, the submarine support dive lockers—that is where the real work gets done. Those are really capable groups of people. We have a great diving capability in the Navy in ship repair, special operations, and EOD. It's the best in the world."

Ms. Little is the senior editor of UNDERSEA WARFARE Magazine.

Q & A

Question and Answer



Three women have qualified to wear dolphins (from left to right): Capt. Mary Townsend-Manning (ret.), Capt. Geraldine Louise Olson (ret.) and Cmdr. Darlene Kay Grasdock. Photos courtesy of Capt. Mary Townsend-Manning (ret.), Capt. Geraldine Louise Olson (ret.) and Cmdr. Darlene Kay Grasdock.

Women Wearing Dolphins:

Three women
qualified to wear dolphins
share their unique stories

The Navy Engineering Duty (ED) Officer Community provides the Navy with experienced naval engineers that ensure our Naval and joint forces operate and fight with the most capable platforms possible. They are involved with the design, acquisition, construction, repair, maintenance, conversion, overhaul, and disposal of ships, submarines, aircraft carriers and the systems on those platforms. In this community are three women who have completed the required qualifications to wear the submarine gold dolphins. While the ED Submarine Warfare Qualification is different than an Unrestricted Submarine Line Officer, the lengthy, rigorous qualification process completed by Capt. (ret.) Mary Townsend-Manning, Capt. (ret.) Geraldine Louise Olson, and Cmdr. Darlene Kay Grasdock to earn the dolphins is an admirable achievement.

These three dolphin wearers recently spoke to UNDERSEA WARFARE Magazine about their qualification process and career impact.

Can you tell us about your career in the Navy prior to qualifying for your Dolphins?

Townsend-Manning: I joined the Navy as an Engineering Duty Officer (EDO) and went straight into that sub-specialty. I initially applied for the dolphin program in October, 1980, but it took about 15 years for me to actually get permission to do the program and get qualified.

My first tour of duty in the Navy was as a quality assurance officer. I supervised repairs on amphibious ships and smaller ships. During that tour I went to the Engineering Officer Basics School where the commanding officer of the school told me that if I wanted a really challenging career I should move into submarine repair.

Following my first tour, I requested assignment on a submarine tender. In the interim, I had applied for the Engineering Duty Officer Dolphin Program. There was one problem — the program wasn't open to women at the time. I was told that if it should, or when it did, become open to women, they would let me know. It wasn't until years later, after I submitted my second application, that the idea of allowing women into the program was reconsidered. I was a lieutenant commander when I actually got my dolphins put on.

Grasdock: During my senior year in college, I interviewed for the Naval Nuclear Propulsion Program at Naval Reactors in Washington D.C. The director at that time, Adm. Bruce DeMars, accepted me into the program to be an instructor. I served my initial tour as a Nuclear Power School instructor. In a later assignment I was an instructor in the Mechanical Engineering Department at the U.S. Naval Academy. Capt. Rick Rubel (then Director, Division of Engineering and Weapons) was an Engineering Duty Officer (EDO) who recommended that I apply for the EDO program. After being accepted into the program, I applied for the EDO Dolphin Program and was accepted.

Following my tour at the Naval Academy, I was assigned to Supervisor of Shipbuilding (SUPSHIP) Groton, Conn. As the ship coordinator for USS *Virginia*

(SSN-774), I was responsible for oversight of shipyard construction and testing for the first ship of the class. I served as the liaison between ship's force, General Dynamics Electric Boat Corporation, and various government agencies and vendors to ensure resolution of technical and production issues.

Olson: I was commissioned as a general unrestricted line officer upon graduation in 1982 from the Naval Academy with a Bachelor of Science degree in Mechanical Engineering. My engineering degree allowed me to be involved with ship maintenance,



Cmdr. D. Grasdock completed some of her training on USS *Annapolis* (SSN-760).

which is not very common as a general unrestricted line officer. I was stationed at TRIDENT Refit Facility (TRF), Bangor, Wash. as a division officer in the Repair Department and then was stationed on a floating drydock (surface) as the Executive Officer. Upon completion of my tour on the drydock, I was selected for a designator change to Engineering Duty Officer. I attended the Naval Postgraduate School in Monterey, Calif. with a follow on tour at Pearl Harbor Naval Shipyard (PHNS). I applied for the EDO Dolphin Program while at PHNS and was transferred to Puget Sound Naval Shipyard (PSNS) via the submarine school to complete my dolphin qualifications.

What about the Submarine Force focused your interest?

Townsend-Manning: I think the reputation of high integrity and the mental challenge of working with the Submarine Force piqued my interest. I thought the complexity of the jobs to be done would be really interesting work. Submariners are the

top part of the Navy to be in, the most elite part of the Navy, and so I wanted to be part of that club.

Grasdock: While serving as an instructor in Orlando, Fla., I quickly realized that Naval Reactors was a unique and exclusive organization. That organization, and their role in the Submarine Force, is what piqued my interest. In particular, the foundational tenants, people who are intelligent, hard working, meticulous, and strive for technical excellence, are what piqued my interest. In my opinion, Naval Reactors and the Submarine Force are the epitome of excellence.

Olson: While stationed at TRIDENT Refit Facility (TRF) Bangor, I was fortunate to work for Capt. Ed Whitehead, who was the Repair Officer and an EDO. He encouraged me to transfer to the Engineering Duty Officer community. While at Bangor, he also encouraged me to ride the TRIDENT submarines for bay trials to get an understanding for how the crew operates and trains and to understand the important

role TRF plays in maintaining an elite submarine force.

The EDO Dolphin Program was also a warfare qualification that would enhance my career opportunities. When I was commissioned, the opportunity to obtain a surface or air qualification was limited in comparison to what is currently available. For the women in my graduating class, there were five billets for Surface Warfare Officers. The ships available were the aircraft trainer [USS *Lexington* (CV-16)] or tenders. The restrictions on placing women on combatants were still in place at that time and the positions available were few.

Can you please describe how you were able to qualify given the limited opportunities to be underway on a submarine?

Townsend-Manning: The majority of the requirements for EDO Dolphin Program are schools, journals, shipyard experience — things that can be done shore side. I completed many of the qualifications along my career path leading up to entry into



Party Officer 3rd Class Chris Olsen

Capt. M. Townsend-Manning (ret.) completed some of her training with the crew of USS *Pennsylvania* (SSBN-735).

the program. The remaining qualifications required temporary assignment to a submarine to finish. One of the requirements was to go through a refit with a TRIDENT submarine to learn how the submarine crew conducted maintenance. My experience started on USS *Pennsylvania* (SSBN-735) just as the submarine was going into a training and refit period. During that time, I became part of the crew and participated in the refit and training. I also spent a lot of time in the trainers. I owe a debt of gratitude to the crew members on *Pennsylvania* who graciously sacrificed their time for the extra training to support my qualifications. Having only 6 or 7 days underway prior to that time, I needed to get enough practical experience driving the submarine so that the commanding officer would be confident enough to qualify me.

Grasdock: Limited underway time on a submarine certainly made qualifications a challenge; however, there are three areas I attribute to helping me overcome this.

One, my engineering background. That is, the undergraduate engineering degree, training and experience I received as an instructor at Nuclear Power School, the education I received as a student working on my master's degree in Mechanical Engineering, and the experience I received teaching at the Naval Academy formed the foundation for my qualifications.

Two, synthetic training and simulation. The Submarine Force has invested significant resources into various training systems, both at Submarine School and onboard submarines. These trainers were instrumental to my qualification process, especially the Ship Control Operator Trainer when I was working on my Diving Officer of the Watch qualifications.

Three, the men of the Submarine Force. After graduating from the Submarine Officer Basic Course, while stationed at SUPSHIP Groton, I studied hard, but I also received qualification support from numerous Sailors. Not only Sailors at the Submarine School who helped me at the trainers, but the various Sailors attached to ships and squadrons. For example, the officers and crew of the USS *Annapolis* (SSN-760) allowed me to train with them during some of their in port training events. Additionally, the staff of Submarine Squadrons TWO, FOUR, and TWELVE helped me obtain qualification checkouts and also helped me schedule in port and at sea training time. Finally, I qualified Diving Officer of the Watch during an underway period with the officers and crew of the USS *Alexandria* (SSN-757). Their support of my qualifications was second to none.

I could go on and on about this third area, but my point is, the people, not the technol-

ogy, of the Submarine Force were the key to my success. They are intelligent, hard working, and talented professionals.

My qualifications took about 3.5 years for both EDO, the first qualification, and EDO dolphin, the second qualification. Although that is an average time for an EDO to qualify dolphins, it is long compared to the Submarine dolphin qualification which is 12 to 18 months. That does not mean the EDO dolphin qualification is harder; it is just different and therefore has a different timeline.

Olson: When I was stationed at Puget Sound Naval Shipyard (PSNS), my leadership knew I was in the program and were very supportive of my efforts. I met with the chief of staff at the submarine group and the submarine squadron. I explained the program and the connection that EDO's have with both construction and maintenance in the Submarine Force. The TRIDENT submarines at Bangor would routinely carry riders from the group and squadron while conducting at sea refresher training. My proposal was to go to sea during those periods for the purposes of my qualifications.

When I wanted to arrange for a ride on a submarine, I would go down to the waterfront and talk to the commanding officer and executive officer to explain what I was doing and why, and get their support in being put on the watchbill as an under

instruction watch. I always had the support from each of the crews that I worked with and their professionalism was unsurpassed.

Since the at sea time was limited, I was able to arrange with the TRF to accompany some of the crews utilizing the trainers, most often the dive trainer. The trainers at that time frequently operated 24 hours-a-day. As such, I could work at the shipyard during the day and in the evenings I was able accompany the submarine crews and train with them. This after hours training routine had follow on benefits when I did go to sea, some members of the crew had already met me and were aware of and supportive of what I was doing.

What made you decide to get dolphins as your warfare qualification?

Townsend-Manning: I originally decided to get my dolphins because I wanted a career in submarine repair and maintenance. That remained my primary reason to continue pursuing the dolphins because if I didn't have them, as I found out, my career with submarines would not have been as fulfilling.

Grasdock: People. I want to work with men and women who build and operate submarines. True, I knew I would never be a crewmember, but I also knew that I would have the opportunity to serve in various other capacities on submarines. In the time since I qualified, I have been to sea on submarines three times.

Olson: As I stated previously, the EDO Dolphin Program allowed me an opportunity to complete a warfare qualification. When I started the qualification process, since I had previously worked at TRF Bangor and was familiar with the submarines, I did not anticipate some of the challenges I would have at the onset.

During this time, the Navy was also downsizing both the fleet and the shore infrastructure. The non-nuclear shipyards were being closed and the non-nuclear tenders were being decommissioned. Obtaining a submarine qualification would allow a greater opportunity of senior positions — while a sub, carrier or surface quali-

fied EDO can compete for some positions, there are other EDO positions that require submarine qualifications.

To address serving on a submarine, the EDO dolphin qualification is not intended to replace or substitute for a line officer sub-



Photo by John Whalen
Cmdr. D. Grasdock currently works in new construction submarines with the Virginia-class and was involved with *New Mexico* (SSN-779).

marine qualification. The EDO dolphins signify knowledge of the engineering design principles of a submarine and the specific maintenance requirements of a submarine to the EDO dolphin candidate.

How has qualifying and wearing Dolphins affected your career?

Townsend-Manning: I had been allowed to do a lot of submarine related tours before, but after I earned my dolphins I was able to qualify to be a submarine repair officer, which would not have been possible without dolphins. I went to Pearl Harbor Naval Shipyard for a tour and became the project superintendent for decommissioning *Los Angeles*-class submarines — a position I could not have had without my dolphins. I also was sent to Washington, D.C., as the SUBSAFE officer-in-charge of the submarine safety and quality program of the Navy, and I couldn't have done that without dolphins. There's certain credibility with wearing dolphins. If you're dealing with other submariners, the warfare pin is a very visual reminder that you are part of the community.

Olson: After I qualified, my follow on tour was in the N4 Maintenance and Material Office at Commander, Submarine Force Pacific (SUBPAC). To receive those

orders, I had to be qualified in submarines. The gold dolphins continued to be an asset when I transferred from SUBPAC to OPNAV N431, Surface and Submarine Readiness.

Grasdock: Following my tour at SUPSHIP Groton, I served at NAVSEA [Naval Sea Systems Command] in Washington D.C. in PMS 392, which was the Strategic and Attack Submarine Program Office. As the private shipyard availability manager, I managed various maintenance and modernization work for submarines undergoing availabilities at Electric Boat and Newport News.

Today, I work new construction submarines for the Virginia-class at Northrop Grumman Shipbuilding in Newport News. I am the Project Officer for SUPSHIP Newport News and the Program Manager's representative to PMS 450, which is the Virginia-class Program Office.

Last year, SUPSHIP Newport News delivered USS *North Carolina* (SSN-777) to the Navy and later this year, we will deliver *New Mexico* (SSN-779). As you can imagine, delivering a ship to the Fleet is rewarding for the shipbuilders, crew and submarine acquisition team. I am honored to work with everyone who builds these ships and delivers them to the Navy.

Yes, wearing dolphins has affected my career. I work with submarine programs and people on a daily basis, and wearing dolphins has had a positive impact on my career in this environment. Just like the warfare pins worn by other Sailors, it is a sign of professionalism, knowledge and credibility.

Bethany Rohrer is an analyst with Alion Science and Technology.



U.S. Navy Photo

USS *Nautilus* (SSN-571) was the world's first operational, nuclear-powered submarine and the first vessel to complete a submerged transit across the North Pole. The *Nautilus's* revolutionary nuclear plant enabled the boat to remain submerged significantly longer than the diesel submarine, dawning a new era in submarine employment.¹

A Historical Journey by USS *Nautilus* (SSN-571)

On Dec. 12, 1951, the Navy announced that the first nuclear powered submarine would be named USS *Nautilus* (SSN-571), the sixth ship of the fleet to bear that name. Her keel was laid by President Harry S. Truman at the Electric Boat Shipyard in Groton, Conn., on June 14, 1952. Under the leadership of then-Capt. Hyman G. Rickover, known as the "Father of the Nuclear Navy", construction of *Nautilus* hinged on the successful development of a nuclear propulsion plant by a group of scientists and engineers at the Naval Reactors Branch of the Atomic Energy Commission.² *Nautilus* was powered by the S2W naval reactor—a pressurized water reactor produced for the U.S. Navy by Westinghouse Electric Corporation.³

Nautilus was launched into the Thames River on Jan. 21, 1954, after eighteen months of construction. First Lady Mamie Eisenhower broke the traditional bottle of champagne across *Nautilus*'s bow and *Nautilus* became the first commissioned nuclear powered ship in the United States Navy. At 11 a.m. EST on the morning of Jan. 17, 1955 the submarine's first commanding officer, Cmdr. Eugene P. Wilkinson, ordered all lines cast off and signaled the memorable and historic message, "Underway on Nuclear Power." Over the next several years, *Nautilus* shattered all submerged speed and distance records.⁴

After preliminary acceptance by the Navy on April 22, 1955, *Nautilus* headed south for shakedown on May 10, 1955. She remained submerged while en route to Puerto Rico, covering 1,381 miles in 89.8 hours, immediately setting submerged endurance and speed records. In July and August, *Nautilus* conducted rigorous exercises with hunter-killer (HUK) groups in Narragansett Bay and off Bermuda. The submarine finished out the year conducting visits to east coast Navy bases, a battery of torpedo firing tests, and Bureau of Ships standardization trials.⁵

Over the next year, the submarine served

as a test platform out of New London, Conn., investigating the effects of the radically increased submerged speed and endurance on anti-submarine warfare (ASW) practices. Such changes in submerged mobility wiped out contemporary ASW techniques. Aircraft and surface radar, which helped defeat diesel-electric submarines during World War II, proved ineffective against a submarine which did not need to surface, could dive to deeper depths, and could clear a search area in record time. In between exercises, *Nautilus* conducted press tours for such luminaries as Edward R. Murrow's "See it Now" program and hosted various distinguished visitors from the Navy and Congress.⁶

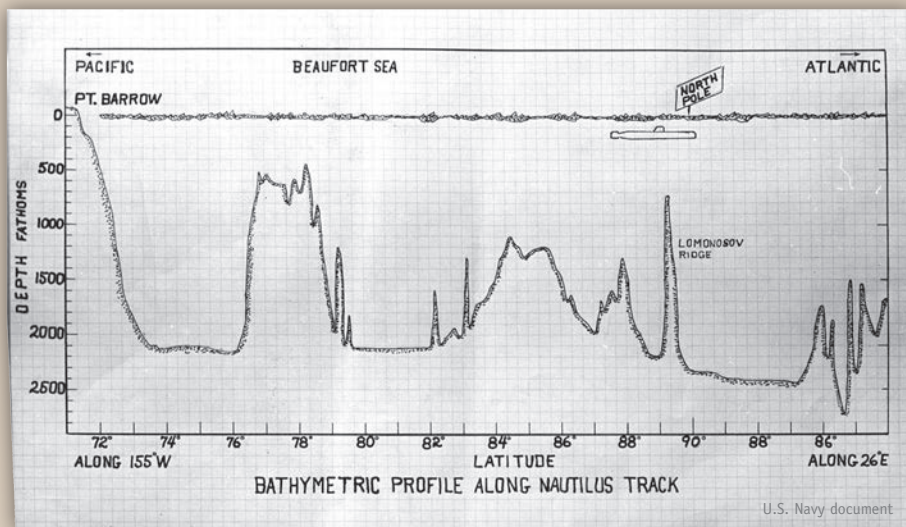
On Feb. 4, 1957, *Nautilus* logged her 60,000th nautical mile, matching the endurance of the fictional *Nautilus*

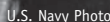
described in Jules Verne's novel *Twenty Thousand Leagues Under The Sea*. In May, she departed for the Pacific Coast to participate in coastal exercises and the fleet exercise, operation "Home Run," which acquainted units of the Pacific Fleet with the capabilities of nuclear submarines.⁷

Nautilus returned to New London, Conn., on July 21, 1957, and departed again on Aug.

SHIP'S POSITION
U. S. S. *NAUTILUS*
TO: COMMANDING OFFICER
(Time of day) 1915U DATE 3 August 1958
LATITUDE 90° 00.0' N LONGITUDE Indefinite
BY (Indicate by check in box) ☒ NGA ☒ MK19 ☐ MK19 ☐ RADAR ☐ VISUAL
DISTANCE MADE GOOD SINCE (time) (miles) —
DISTANCE TO North Pole MILES Zero
TIME REQ. Error 180 MK19 3E MK23 0 VARIATION 170 E
MAGNETIC COMPASS, DE ALONG (check one) ☐ STD ☐ STEER ☒ REMOTE ☐ OTHER 244 359
DEVIATION 126E 3° W Dev. (Indicate by check in box) ☐ ON ☒ OFF
REMARKS: NGA DR
 $\sigma = 0$
 $N = 0$
 $N_2 = 0$
 $N_3 = 1$
RESPECTFULLY SUBMITTED (Signature of) LT Shepherd M. Jenkins, USN
U.S. Navy document

(Opposite) The crew of the USS *Nautilus* (SSN-571) stand quarters for muster as she enters New York harbor. One of many tugs displays her greeting with New York skyline in background. *Nautilus* had recently made the trans-polar voyage under the arctic ice. (Above) Navigator's position report to the captain showing the USS *Nautilus* (SSN-571) at the North Pole. (Below) Ocean bottom profile taken along the track of the USS *Nautilus* (SSN-571) during transpolar voyage.





U.S. Navy Photo

24 | SUMMER 2009 UNDERSEA WARFARE

lowing summer of 1958. The White House then issued orders to execute what was to become "Operation Sunshine," a mission name which implied a trek to southern climates.¹⁶

Why the Secrecy?

Operation Sunshine was so secretive that the story of a routine Pacific cruise was created for *Nautilus*' and her crew. To explain *Nautilus*' appearance on the West Coast, a cover story was created involving a series of anti-submarine exercises in a supposed effort to familiarize military ships and aircraft with a nuclear submarine.¹⁷

The operation became known as the most top secret peacetime naval operation in history for two reasons. First, in proceeding through the Bering Strait, and while well removed from the territorial waters of the Soviet Union, *Nautilus* might have possibly neared areas of Soviet submarine operation. Second, White House officials preferred to attempt the voyage first and wait for success before making any announcements after the Vanguard debacle and its fallout. As such, few people within the government were privy to the plans for *Nautilus* as the summer of 1958 approached.¹⁸

Operation Sunshine was first and foremost a White House mission, planned to enhance the United States' image domestically as well as internationally. *Nautilus*'s crew remained in the dark as to their real destination as *Nautilus* left Groton, Conn., on April 25, 1958.¹⁹

Arctic Challenges

Capt. Anderson, in his memoir of the *Nautilus*' first polar voyages, *Nautilus 90 North*, wrote that ice covering the Arctic Ocean is not a solid layer, but "composed of huge chunks and floes, varying greatly in size and thickness, grinding one upon the other, creating the effect of a solid mass." An ice floe collision could easily destroy a submarine. Dr. Waldo Lyon, a Navy scientist, had developed a device several years earlier that would help a submarine avoid the ice. *Nautilus*' sonar supervisor, Al Charette, described the invention as a sort of inverted depth sounder, or fathometer: "Instead of sounding toward the bottom, with the transducer on the bottom of the ship, the transducer was on the top of the ship, looking up at the bottom profile of the ice."²⁰

Northern latitudes pose the most difficult navigational challenge a sailor can



U.S. Navy Photo

encounter. As it nears the pole, a magnetic compass which is oriented toward magnetic, rather than geographic north, becomes essentially worthless. To remedy this, a gyro-compass with its core aligned to true north, measures deviations from that axis, and performs more reliably, however it is also known to behave erratically as it nears true north as east-west meridians converge on the pole. Capt. Anderson in his memoir wrote: "At the North Pole, every direction you face is south" describing that situation as "longitude roulette." *Nautilus* would have to wait until 1958 to be given a strategy that would help it avoid such a dangerous game of chance.²¹

The inertial navigation system was the most useful piece of equipment brought aboard *Nautilus* in April, 1958. The device was designed for use in the Air Force's winged Navajo missile by North American Aviation which had recently been discontinued in favor of the Atlas Intercontinental Ballistic Missile (ICBM). The inertial navigator operated independently of any reference point unlike any navigation aid then in use except for the craft's starting position. An elaborate set of sophisticated internal mechanisms and electronics calculated the direction and distance of the boat's every movement and rotation. The navigator created a virtual map of *Nautilus*'s voyage from start to finish.²²

Anderson was initially skeptical of the inertial navigator although impressed with the technology. "It was the first time such a system had ever been used in a ship, and as you would guess, a lot of debugging had to go on, and a lot of workup."²³

First Attempt at Operation Sunshine

In her first attempt at completing Operation Sunshine, *Nautilus* departed Seattle for the polar ice pack on June 9, 1958, and at that time, the crew was told of their destination. The machinist's mate, Bill McNally, remembers Anderson's announcement to the crew in which he stated that they were headed home to New London. "But the captain turned right instead of left. He said we were going home by way of the North Pole, and that's when we learned we were actually going to do it." As Capt. Anderson announced their surprise route, Sonarman Charette recalled, "One of the terms he used was that our job was to 'out-Sputnik the Russians.'"²⁴

Believed to be the most direct course, the intended route (to take *Nautilus* north through the Bering Strait, west around the Siberian side of St. Lawrence Island, and then into the Chukchi Sea, a shallow, 400-mile expanse) would ultimately deliver the boat to the Arctic Basin. However, in early June the ice was far too hazardous for

Nautilus to successfully navigate. At times, there were only 45 feet of water below and 25 feet above *Nautilus*. *Nautilus* passed under a huge floe that was 30 feet below the surface.²⁵

Capt. Anderson's dilemma was a difficult one: if *Nautilus* encountered thicker ice, she wouldn't make the passage. The captain arrived at the decision to keep his crew and boat safe for another journey by turning south and eastward, in the direction of the Alaskan side of St. Lawrence Island. Careful threading through the Strait, in waters so shallow that she could only go around rather than under ice, allowed *Nautilus* to safely enter the Chukchi Sea. *Nautilus* met a mile-long ice floe that projected more than 60 feet below the surface in the Chukchi Sea. *Nautilus* cleared it by a mere 5 feet while moving at a crawl. Anderson recalled in *Nautilus 90 North*, "I waited for, and honestly expected, the shudder and jar of steel against solid ice." Capt. Anderson realized that this initial effort had failed and the only way home was south.²⁶

Second Attempt—Success

Nautilus departed Pearl Harbor, on July 23, 1958, and at 11:15 p.m. on Aug. 3, 1958, Capt. Anderson, announced to his crew, "For the world, our country, and the Navy—the North Pole." With 116 men aboard, *Nautilus* had accomplished the "impossible," reaching the geographic North Pole—90 degrees North.²⁷ She submerged in the Barrow Sea Valley August 1, 1958, and on August 3rd, at 11:15 p.m. (EDST) became the first ship to reach the geographic North Pole. It would be two days before *Nautilus* surfaced northeast of Greenland and transmitted her historic message to the outside world: "*Nautilus 90 NORTH*."²⁸

Capt. Anderson in his memoirs recounted: "There was no doubt in my mind that *Nautilus* could penetrate the ice safely and efficiently from the Greenland-Spitsbergen side of the pack, as we had done in 1957. The water there was quite deep. I knew that the really formidable problem lay on the other side, in the Bering Strait and the Chukchi Sea, a small body of water lying between the Strait and the Arctic Ocean."²⁹

"Viewed from the top of the world, this area resembles a huge funnel, with the spout—the Bering Strait—lying to the south. There the ice is far more irregular and hazardous than that on the Greenland side. Blown southward against the walls of the

funnel, represented by Alaska and Siberia, the ice 'chokes up' at the narrow mouth. In fact, it jams, layer upon layer against these rugged coastlines, and as a result is far thicker than the ice near the North Pole. To make matters worse, the waters of the Strait and Chukchi Sea are quite shallow, averaging not more than 120 feet, much too shallow for ordinary submarine operations. If a submarine in those waters encountered deep-hanging ice, it might not be able to get beneath or around it. It would be a hair-raising problem of threading through dangerous ice, seeking out the few deeper ocean-floor valleys which lead northward in the Arctic Basin."³⁰

"From a pure operational standpoint, the question was: could a submarine negotiate this track in the face of possible poor weather and navigational errors? There would not be many feet to spare in either direction. Yet it could be done. I was certain of that. And I said so."³¹ In a worst case scenario, Capt. Anderson considered using torpedoes to blow a hole in the ice if *Nautilus* needed to surface.³²

In order to insure that all gyrocompasses remained properly oriented, we made all course, speed, and depth changes extremely slowly. For example, when we came near the surface to decrease water pressure on the hull, we rose with an angle of one or two degrees, instead of the usual twenty to thirty degrees. So gradual was the shift that six minutes elapsed before settling on a new heading. Somebody jokingly suggested that when they neared the Pole they might put the rudder hard over and make twenty-five tight circles, thus becoming the first ship in history to circle the earth nonstop twenty-five times.³³

After crossing the Pole, Capt. Anderson made his way to join the "North Pole Party" in the crew's mess. His first act was to pay modest tribute to the man who had made the historic trip possible, President Eisenhower. A few minutes before, Anderson had written him a message which concluded: "I hope sir, that you will accept this letter as a memento of a voyage of importance to the United States." In the mess, before seventy crew members of *Nautilus*, the captain signed the letter as well as one to Mrs. Eisenhower who had christened the ship.³⁴

The Effects

Nautilus completed the first successful voyage across the North Pole and then continued 96 hours and 1,830 miles

under the ice before surfacing northeast of Greenland.³⁵ From there, as recalled by Capt. Anderson, events moved more swiftly than either he or the crew could absorb at the time. The captain boarded a helicopter off the coast of Iceland to make his way toward Washington, where he reported directly to President Eisenhower. An exhausted Capt. Anderson gave the President the memento letter written by him aboard *Nautilus*. The captain presented Mrs. Eisenhower the boat's clocks which were stopped at the exact moment she had crossed the pole.³⁶

News of the trip was released after that meeting when he joined the president at an adjoining press conference at which time Eisenhower awarded the officers and crew of *Nautilus* the Presidential Unit Citation—the first time it had ever been awarded to a naval vessel in peacetime. Anderson, for his part, was awarded the Legion of Merit.³⁷ All members of the *Nautilus* crew who made the voyage were authorized to wear their Presidential Unit Citation ribbon with a special clasp in the form of a gold block letter N to commemorate the first submerged voyage under the North Pole.³⁸

Before he had time to reflect on these events, Anderson was snatched away to rejoin the *Nautilus* before her arrival in England. He'd had his taste of the attention the world was about to shower on *Nautilus* and her crew, but the men aboard were still in the dark. When they reached England, Al Charette, *Nautilus'* sonar supervisor for the successful arctic voyage said, "We were met by the press and by hundreds of people at the pier."

It would take years for Charette and the rest of the crew to realize the impact of what they had done: "What we were supposed to have done was open up a new sea route, and we did that, but the commercial world never made any use of it." In fact, much was made of the voyage's practical implications at both the White House press conference and in a lead story in the following day's *New York Times*.³⁹ Anderson spoke of the potential for cargo submarines to use the Arctic route, and the press secretary pointed out that the standard London-to-Tokyo distance—11,200 nautical miles via the Panama Canal—had just had nearly 5,000 miles sliced from it.⁴⁰ Today, the Arctic remains too dangerous for the private shipping industry to allow for successful exploitation of the transit route.⁴¹

Unlike the taunting Soviet diplomats at

the United Nations delivered after Sputnik's launch, Eisenhower, Anderson, and everyone else associated with the voyage preferred to leave the real implication of *Nautilus*'s transpolar voyage unspoken. But it was certainly not lost on the Soviets. Charette notes "Knowing that we could operate it [*Nautilus*] safely under the ice, it was known that a Polaris submarine could operate safely under the ice. Without an equivalent submarine, there was no way to go in and find that guy... So we could be right in their backyard, and there was nothing they could do about it."⁴²

The Soviets, while stunned by *Nautilus*' triumph, weren't exactly caught flat-footed. Four years later, their first nuclear submarine, the K-3, would surface at the North Pole, re-establishing its submarine fleet and neutralizing the United States' strategic advantage in the Arctic.⁴³

After leaving England and quietly establishing a speed record for a submerged Atlantic crossing, the *Nautilus* crew was saluted in New York Harbor by a noisy fleet of tugboats and fireboats which Capt. Anderson described as "absolutely overwhelming."⁴⁴ An estimated total of 20,000 persons visited the New York Naval Shipyard in Brooklyn to inspect the atomic submarine *Nautilus*.⁴⁵ The crew was given a ticker-tape parade through downtown Manhattan. A crowd estimated by the police at 250,000 lined Broadway from Bowling Green to the City Hall.⁴⁶

Anderson was later pictured on the cover of the following month's issue of *Life* magazine. While proud of the accomplishment, he said he was uneasy about having become a figurehead for the polar trip. "I served a long time in submarines, and under many different circumstances, and I was prepared for just about any situation a submarine guy could confront, but I was totally unprepared for the aftermath of the polar trips. I dealt with it the best I could, at the same time feeling—as I still do—a certain resentment for the human tendency to concentrate attention and fame on the guy in charge, when, in this case, more than most anything I can imagine, it took the superb work of a crew of 115 to get the job done...I've always had that feeling of discomfort, at how difficult it is to get the credit shared where it should go: to all hands."⁴⁷

Postscript

In 1964, Anderson entered the



Cmdr. W.R. Anderson, USN, commanding officer of the USS *Nautilus* (SSN-571) on the bridge during a period of low visibility searches for a spot deep enough to submerge safely under the ice to pass under the North Pole.

Democratic primary in Tennessee to replace Sixth District Congressman Ross Bass, who was running for the United States Senate to finish the term of the late Estes Kefauver, and won both the nomination and the subsequent general election. Anderson was reelected three times.⁴⁸

For the remainder of 1958, *Nautilus* operated from her home-port, New London, Conn.⁴⁹ In May, 1959, *Nautilus* entered Portsmouth Naval Shipyard, Kittery, Maine, for her first complete overhaul. This marked the first overhaul of any nuclear powered ship, and the replacement of her second fuel core. Upon completion of her overhaul in August 1960, *Nautilus* departed for a period of refresher training, then deployed to the Mediterranean Sea to become the first nuclear powered submarine assigned to the U.S. Sixth Fleet.⁵⁰

Over the next six years, *Nautilus* participated in several fleet exercises while steaming over 200,000 miles. In the spring of 1966, she again entered the record books when she logged her 300,000th mile underway. During the following 12 years, *Nautilus* was involved in a variety of developmental testing programs while continuing to serve alongside many of the more modern nuclear powered submarines she had preceded.⁵¹

In the spring of 1979, *Nautilus* set out from Groton, Conn., on her final voyage. She reached Mare Island Naval Shipyard, Vallejo, Calif., on May 26, 1979, her last day underway. She was decommissioned on March 3, 1980, after a career spanning

25 years and over half a million miles steamed.⁵²

In recognition of her pioneering role in the practical use of nuclear power, *Nautilus* was designated a National Historic Landmark by the Secretary of the Interior on May 20, 1982. Following an extensive historic ship conversion at Mare Island Naval Shipyard, *Nautilus* was towed to Groton, Conn., arriving on July 6, 1985.⁵³

On April 11, 1986, eighty-six years to the day after the birth of the Submarine Force, the historic ship, *Nautilus*, joined by the Submarine Force Museum, was opened to the public as the first and finest exhibit of its kind in the world, providing an exciting, visible link between yesterday's Submarine Force and the Submarine Force of tomorrow.⁵⁴

End notes for this article are available in the online version at <http://www.navy.mil/navydata/cno/n87/mag.html>

Mr. Reagle was an associate editor for UNDERSEA WARFARE Magazine. He now practices law in Pa.



USS *Ohio* (SSGN-726) Earns Battle “E” Following Remarkable Year

by Petter Officer 2nd Class Chantel M. Clayton



Photo by Petty Officer 2nd Class Clifford L. H. Davis



Photo by Lt. Cmdr. David Benham

(Left) The guided-missile submarine USS *Ohio* (SSGN-726) is underway during ANNUALEX 2008. ANNUALEX is a bilateral exercise between the U.S. Navy and the Japanese Maritime Self-Defense Force. (Right) Crew members of the guided-missile submarine USS *Ohio* (SSGN-726) prepare to moor at Naval Station Pearl Harbor for the final stop before returning to homeport at Bangor, Wash.

The guided-missile submarine USS *Ohio* (SSGN-726) received the Battle Efficiency award, or Battle “E,” during ceremonies held in late February aboard Naval Base Kitsap.

“The crew worked extremely hard during the ship’s 14-month deployment to the Western Pacific,” said *Ohio* (GOLD) Commanding Officer, Capt. Dennis Carpenter. “Both crews worked extremely hard, even while in port, to be trained and certified in all aspects of our mission areas. We also performed well

during those missions while deployed, which helped us to be able to win the Battle ‘E.’”

In addition to the Battle “E,” the *Ohio* received other honors, such as the Tactical “T” and the Deck Seamanship “D” awards.

“The Tactical ‘T’ was for tactical employment of the ship within our certifications and the exercises and operations that we conducted,” said Carpenter.

“The Deck Seamanship ‘D’ was due to a lot of hard work by a small portion of the crew to keep our topside in excellent condition. We had very high level visitors that were coming down every time we pulled into port, and each time those guys had to paint the entire topside of our ship and keep it up. Even while some of the other guys were going on liberty, and even some times at night, these guys are topside painting the ship.”

The *Ohio* (BLUE) crew was also awarded the Navigation “N” and the Engineering “E.”

“The crew has very high standards and this award reflects that,” said Capt. Murray Gero, *Ohio* (BLUE) commanding officer. “We are very proud of the entire crew. The *Ohio* (BLUE) team’s focus is on the mission and we work hard to perfect our individual and team expertise.”

Carpenter said that the Battle “E” award is a testament of the crew working together as a team to accomplish the mission.

“The success of a submarine is not due to just any one person. Everyone’s job is very important, down to the most junior Sailor. If he’s not doing his job, we have problems. The success of the *Ohio*, both crews, is due to teamwork, everyone showing up and contributing to the success of the ship.”

For the crew, earning this award is a good way for them to be recognized for the work they do.

“It’s a great sense of accomplishment for how hard we worked this past year and all the training we’ve done,” said Petty Officer 2nd Class (SS) Shaun Wintink, *Ohio* (GOLD) crew. “It’s nice to be recognized for how well we’ve operated the ship at sea. I think it’s a great way for the whole crew to be recognized that we can proficiently operate the ship at sea and do it well.”

Submarine Group TEN Change of Command



Photo by Petty Officer 1st Class Kimberly Clifford

Commander, Submarine Group TEN held a change of command ceremony aboard Naval Submarine Base, Kings Bay, Ga., June 26. Rear Adm. Barry L. Bruner relieved Rear Adm. Timothy M. Giardina, re-establishing a full-time flag officer in Kings Bay responsible for ballistic missile submarines (SSBNs) and guided missile submarines (SSGNs). Bruner’s arrival to Kings Bay marks the first time since 2005 that a Navy flag officer will reside full time in Kings Bay. The full-time flag officer will increase focus on the unique capabilities of the SSGN platform and re-emphasize commitment to the strategic deterrence mission of the SSBNs. Giardina took command of Submarine Group TEN Nov. 8, 2007.



Changes of Command

Commodore of
Submarine Squadron 20
Capt. Kevin Brenton relieved
Capt. Dan Mack

USS Columbus (SSN-762)
Cmdr. Dave Minyard relieved
Cmdr. James Doody

USS Kentucky (SSBN-737)(B)
Cmdr. Eduardo R. Fernandez relieved
Cmdr. Alan W. Holt II

USS Louisiana (SSBN-743)(G)
Cmdr. Joseph Turk relieved
Capt. Shannon Kawane

USS Maryland (SSBN-738)(B)
Cmdr. John Newton relieved
Cmdr. Robert Hudson

USS Nebraska (SSBN-739)(G)
Cmdr. Michael Fisher relieved
Cmdr. Carl Lahti

USS Wyoming (SSBN-742)(B)
Cmdr. William McKinney relieved
Cmdr. William Combes

Qualified Nuclear Engineer Officer

Lt. Brendan Gotowka
USS Santa Fe (SSN-763)

Lt. Johann Guzman
USS Columbus (SSN-762)

Lt.j.g. Aaron Aaron
USS Helena (SSN-725)

Lt.j.g. Allen Baker
USS Tucson (SSN-770)

Lt.j.g. Hans Biebl
USS Connecticut (SSN-22)

Lt.j.g. Thomas Brown
USS Kentucky (SSBN-737)(G)

Lt.j.g. David Chaney
USS Kentucky (SSBN-737)(G)

Lt.j.g. Carl Christensen
USS Houston (SSN-713)

Lt.j.g. Matthew Cole
USS Maine (SSBN-741)(B)

Lt.j.g. Matthew Collinsworth
USS City of Corpus Christi (SSN-705)

Lt.j.g. Philip Connor
USS Santa Fe (SSN-763)

Lt.j.g. Sjaak Devlaming
USS Los Angeles (SSN-688)

Lt.j.g. Joel Godfrey
USS Bremerton (SSN-698)

Lt.j.g. Henry Hargrove
USS Nevada (SSBN-733)(B)

Lt.j.g. Dustin Kraemer
USS Columbia (SSN-771)

Lt.j.g. Jamie Mason
USS Ohio (SSGN-726)(G)

Lt.j.g. Clark Munger
USS Ohio (SSGN-726)(B)

Lt.j.g. Toan Nguyen
USS Cheyenne (SSN-773)

Lt.j.g. David Oldham
USS Columbus (SSN-762)

Lt.j.g. Daniel Patrick
USS Kentucky (SSBN-737)(G)

Lt.j.g. Nathan Peck
USS Jimmy Carter (SSN-23)

Lt.j.g. Leon Platt
USS Nebraska (SSBN-739)(B)

Lt.j.g. Kyle Sampson
USS City of Corpus Christi (SSN-705)

Lt.j.g. Kai Seglem
USS Ohio (SSGN-726)(B)

Lt.j.g. Michael Siedsma
USS La Jolla (SSN-701)

Lt.j.g. Matthew Strother
USS Los Angeles (SSN-688)

Qualified for Command

Lt. Cmdr. Burt Canfield
COMSUBPAC

Lt. Cmdr. David Coe
COMSUBRON 17

Lt. Cmdr. Scott Cullen
USS Olympia (SSN-717)

Lt. Cmdr. Steven Everhart
USS Charlotte (SSN-766)

Lt. Cmdr. Christopher George
USS Florida (SSGN-728)(B)

Lt. Gregory R. Koepp
Naval Submarine School New London

Lt. Cmdr. Christopher Lord
Squadron 20

Lt. Cmdr. Kevin Macy
USS Ohio (SSGN-726)(G)

Lt. Cmdr. Leighton Pitre
USS Helena (SSN-725)

Lt. Cmdr. Paul Seitz
USS Santa Fe (SSN-763)

Lt. Andrew Cain
USS Buffalo (SSN-715)

Lt. Jason Grizzle
USS Asheville (SSN-758)

Lt. Chad Hardt
USS Chicago (SSN-721)

Lt. David Palilonis
USS Maine (SSBN-741)

COMSUBFOR Visits Peru in Support of DESI



U.S. Navy Photo

During a recent trip to Peru, Vice Adm. John Donnelly, Commander, Submarine Force, and Vicealmirante Carlos Arturo Chanduvi Salazar, Commander, Naval Operations Pacific — Marina de Guerra del Peru, signed a Memorandum of Agreement in support of the U.S. Navy Diesel-Electric Submarine Initiative (DESI). The DESI Program, in combination with other regional exchange initiatives, has been an important part in strengthening regional security and naval interoperability. Both navies have been able to train together and work side by side to develop the cooperative relationships necessary to advance both countries's interests. This relationship is seen in the cooperation enjoyed between the navies of Peru and the United States. For the past eight years, Peruvian submarine crews have participated in more than 500 days of naval exercises with U.S. and partner countries. Currently, the BAP *Arica* (SS-36) is deployed under this initiative and participating with U.S. Third Fleet units in fleet exercises off the coast of Southern California.



California (SSN-781) Keel Laying Ceremony



Photo by Ricky Thompson

Dignitaries and invited guests participate in the keel-laying of the *Virginia*-class attack submarine Pre-Commissioning Unit *California* (SSN-781) at Northrop Grumman Shipbuilding. Mrs. Donna Willard, wife of Adm. Robert F. Willard, the 32nd and current Commander, U.S. Pacific Fleet, is the ship's sponsor. Guests watched as her initials were welded into a portion of the keel during the ceremony. *California* is the eighth *Virginia*-class submarine.

Lt.j.g. Andrew Thornburg
USS Ohio (SSGN-726)(B)

Line Officer Qualified in Submarines

Lt. John Lysinger
USS New Hampshire (SSN-778)

Lt. Luis Morales-Benitez
USS Santa Fe (SSN-763)

Lt.j.g. Timothy Allensworth
USS Annapolis (SSN-760)

Lt.j.g. John Barnett
USS Florida (SSGN-728)(B)

Lt.j.g. Charles Barreras
USS Wyoming (SSBN-742)(B)

Lt.j.g. Michael Billings
USS Houston (SSN-713)

Lt.j.g. Phillip Boice
USS Hawaii (SSN-776)

Lt.j.g. John Bui
USS Michigan (SSBN-727)

Lt.j.g. Ryan Bush
USS Cheyenne (SSN-773)

Lt.j.g. Mark Cartwright
USS Georgia (SSGN-729)(B)

Lt.j.g. Jonathan Cebik
USS Pasadena (SSN-752)

Lt.j.g. Britton Chauvin
USS Wyoming (SSBN-742)(B)

Lt.j.g. Adam Christopher
USS Alabama (SSBN-731)(B)

Lt.j.g. James Colgary
USS Michigan (SSBN-727)(B)

Lt.j.g. Wade Conaway
USS West Virginia (SSBN-736)(B)

Lt.j.g. Jonathan Connelly
USS Hawaii (SSN-776)

Lt.j.g. Sean Cronin
USS Annapolis (SSN-760)

Lt.j.g. Darren Cutler
USS Annapolis (SSN-760)

Lt.j.g. Jay Davis
USS City of Corpus Christi (SSN-705)

Lt.j.g. Jeremy Dawson
USS Kentucky (SSBN-737)(B)

Lt.j.g. Christopher Delagranger
USS New Hampshire (SSN-778)

Lt.j.g. Matthew Eisenback
USS Rhode Island (SSBN-740)(G)

Lt.j.g. Paul Evans
USS Ohio (SSGN-726)(B)

Lt.j.g. Derek Fletcher
USS Tucson (SSN-770)

Lt.j.g. Bradford Foster
USS Columbia (SSN-771)

Lt.j.g. Jeremy Garcia
USS West Virginia (SSBN-736)(B)

Lt.j.g. Kyle Gish
USS Asheville (SSN-758)

Lt.j.g. Peter Golden
USS San Juan (SSN-751)

Lt.j.g. Daniel Guerrant
USS Maine (SSBN-741)(G)

Lt.j.g. Philip Hall
USS Maryland (SSBN-738)(B)

Lt.j.g. Aaron Hickman
USS Tennessee (SSBN-734)

Lt.j.g. David King
USS Georgia (SSGN-729)(B)

Lt.j.g. Seth Krueger
USS Louisiana (SSBN-743)(B)

Lt.j.g. Nicholas Jackson
USS Michigan (SSBN-727)(B)

Lt.j.g. David Johnson
USS Michigan (SSGN-727)(G)

Lt.j.g. Thomas Johnson
USS Cheyenne (SSN-773)

Lt.j.g. Anree Little
USS Rhode Island (SSBN-740)(G)

Lt.j.g. Thomas Lyman
USS Florida (SSGN-728)(B)

Lt.j.g. Paul Magnuson
USS Maryland (SSBN-738)(B)

Lt.j.g. John Malone
USS Rhode Island (SSBN-740)(B)

Lt.j.g. Walter McDuffie
USS Maryland (SSBN-738)(B)

Lt.j.g. Phillip Messner
USS Hartford (SSN-768)

Lt.j.g. Keith Miller
USS Alabama (SSBN-731)(G)

Lt.j.g. Jeffrey Morrison
USS Helena (SSN-725)

Lt.j.g. Justin Ogburn
USS Albuquerque (SSN-706)

Lt.j.g. Eric Olson
USS Pennsylvania (SSBN-735)(B)

Lt.j.g. Robert Osborne
USS Helena (SSN-725)

Lt.j.g. Michael Peters
USS New Hampshire (SSN-778)

Lt.j.g. Tyrone Pham
USS Alabama (SSBN-731)(B)

Lt.j.g. Leon Platt
USS Nebraska (SSBN-739)(B)

Lt.j.g. Brandon Pontius
USS New Hampshire (SSN-778)

Lt.j.g. Andrew Ra
USS Tucson (SSN-770)

Lt.j.g. Tad Robbins
USS Wyoming (SSBN-742)(B)

Lt.j.g. Jerome Rolinger
USS Rhode Island (SSBN-740)(B)

Lt.j.g. Justin Ross
USS West Virginia (SSBN-736)(B)

Lt.j.g. Richard Sanford
USS Kentucky (SSBN-737)(B)

Lt.j.g. Jeremy Saria
USS Toledo (SSN-769)

Lt.j.g. Joseph Schindele
USS Key West (SSN-772)

Lt.j.g. Charles Slater
USS Pittsburgh (SSN-720)

Lt.j.g. Michael Smith
USS San Juan (SSN-751)

Lt.j.g. Ryan Stewart
USS Florida (SSGN-728)(B)

Lt.j.g. Anthony Stranges
USS Nevada (SSBN-733)(B)

Lt.j.g. Robert Syre
USS Santa Fe (SSN-763)

Lt.j.g. Chad Tella
USS Santa Fe (SSN-763)



Lt.j.g. Kyle Thayer
USS Asheville (SSN-758)

Lt.j.g. Max Tubbesing
USS Columbia (SSN-771)

Lt.j.g. Joshua Wall
USS Alaska (SSBN-732)

Lt.j.g. Raymond Wiggin
USS Kentucky (SSBN-737)(G)

Lt.j.g. Matthew Williams
USS Alaska (SSBN-732)

Lt.j.g. Thomas Williams
USS Topeka (SSN-754)

Lt.j.g. Brian Windmiller
USS Albany (SSN-753)

Lt.j.g. Derek Wood
USS Kentucky (SSBN-737)(B)

Lt.j.g. Matthew Yanoff
USS Connecticut (SSN-22)

Limited Duty Officer Qualified in Submarines

Lt. Daryl Linhardt
USS Tucson (SSN-770)

Supply Officer Qualified in Submarines

Lt.j.g. Arnold Dauz
USS Cheyenne (SSN-773)

Lt.j.g. Eric Folkers
USS Tucson (SSN-770)

Lt.j.g. Benjamin Hixson
USS San Juan (SSN-751)

Lt.j.g. Paul Matthews
USS Hawaii (SSN-776)

Ens. Christopher Hilliard

USS Hartford (SSN-768)

Ens. Eugene Ho
USS Springfield (SSN-761)

Ens. Matthew Warner
USS Jacksonville (SSN-699)

USS *Florida* (SSGN-728) Returns from Maiden Deployment

by Submarine Group TEN Public Affairs



(Left) The USS *Florida* (SSGN-728) gets underway from her homeport of Kings Bay, Ga. (Right) Sailors aboard the guided-missile submarine USS *Florida* (SSGN-728) throw lines as the boat moors at Naval Submarine Base, Kings Bay, Ga. after a maiden deployment.

Naval Submarine Kings Bay welcomed USS *Florida* (SSGN-728) (GOLD) home from her maiden deployment as a guided missile submarine to May 8.

Florida is the first ever Atlantic Fleet *Ohio*-class SSGN to be forwarded deployed. *Florida* began her maiden deployment on April 26, 2008 and the arrival of *Florida* marked the first time the submarine returned to its homeport in 13-months.

Florida's two crews, each completed two deployment periods, swapping crews in Diego Garcia. The crews achieved a number of

milestones for a SSGN, including the first transit of the Suez Canal and visits to Gibraltar, Jebel Ali, Souda Bay, and Diego Garcia.

Florida conducted operations in the 5th and 6th Fleets area of responsibilities. Their missions comprised mostly of littoral operations in support of combatant commander Irregular Warfare requirements.

"We put a lot of hard work into what we did," said Command Master Chief Randy Huckaba. "I'm very proud of the crew. They are an incredible crew, top-notch."

USS *San Francisco* (SSN-711) Arrives at San Diego

USS *San Francisco* (SSN-711) is undergoing a modernization period in her new homeport of San Diego. She had spent the previous four years undergoing various repairs after striking a sea mount in January 2005. Petty Officers Robert Hutson and Andrew Tillman, members of San Francisco's crew, were onboard San Francisco in January 2005 and extended their tours to stay with her through the repair period. "I just wanted to see it through," said Hutson, a petty officer first class from Cleveland.





Beyond the S8G Hull: A JO's Perspective on a Shift Engineer Tour

by Lt. Dave Latta, USN

I volunteered for prototype duty for three reasons: to reinforce my nuclear foundation, to learn from the inherent challenges of the prototype organization, and to spend a few years in New York's beautiful Saratoga region. In my 31 months assigned to Nuclear Power Training Unit (NPTU) Ballston Spa, I trained students at the S8G/AFR prototype, earned a masters degree in management from Rensselaer Polytechnic Institute (RPI), finished my Joint Professional Military Education (JPME) Phase I coursework, and got married. From a career management perspective, I put a check in the box for both nuclear duty and instructor duty. But more importantly, I built a network of friends and shipmates that will serve me well in future assignments.

A strong foundation in nuclear theory and operational experience is fundamental to a challenging, rewarding, and fast-paced career. In the Submarine Force, the engineer is spot-promoted to lieutenant commander upon reporting and at least one of the commanding officer or executive officer has previously served as an engineer. For those junior officers who want to explore a possible future in the commercial nuclear power industry, two years of prototype duty provides invaluable experience in land-based reactor safety and support systems. Navy nuclear trained operators are well prepared to start civilian careers in the commercial industry.

As a prototype shift engineer, junior officers, and their civilian counterparts, have remarkable autonomy to run their watch sections and show leadership through the myriad of operations that the staff and students undertake in the plant at any given time. With so many diverse groups—students, instructors, plant and site management, maintenance contractors, etc.—interested in their aspect of plant operations, watch officers receive a wealth of valuable experience in the principles of managing people, operations, and maintenance at the same time. While there have been times when I have ended my day frustrated at some minutia of prototype duty, I more often left with a feeling of satisfaction as a result of a student's performance or a complex evolution effectively executed. This is especially true on the back shifts when the majority of the staff leadership is away and it is just me and my Sailors.

Without a doubt, interacting with and providing leadership and guidance to the students is hands down the most rewarding aspect of prototype duty. As submarine officers, we all have our own ideas about the effectiveness of instructional techniques and we all vividly remember our own prototype experiences (I was assigned to MTS-635 in Charleston, S.C.). Prototype instructor duty was my chance to apply all the experiences, tools, and lessons accumulated from my training pipeline and initial sea tour and then tailor an approach to accommodate each student's personality and motivation to achieve their fullest potential. Indeed, a prototype instructor has a very real



Team NPTU founders Lt. Rich Gargano and MM1/SW Jake Davis pose with Carrie Davis in front of the Saratoga Race Course before a training ride.

opportunity to make a defining impact on the individuals that we send to the fleet.

Prototype is not solely about nuclear power. Within each prototype there is ample opportunity to develop the whole Sailor, instead of just Navy nuclear propulsion operators. Recently, about forty staff and student crewmembers took a "heritage trip" to Boston that was highlighted by a belowdecks tour of the *USS Constitution*. A number of instructors also train with the Team NPTU Multi-Sport Club, a loose organization designed to promote fitness and competition. Leagues for softball, football, and basketball routinely pit prototype crews against one another in friendly and spirited competition. And finally, there are a number of opportunities to teach and build relationships with civilian engineers at off-site contractor facilities.

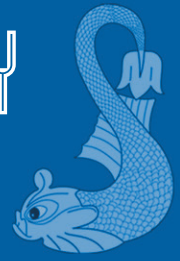
In today's military and civilian professional world, education is a key enabler to leadership positions. Historically, graduate education was difficult to obtain while at prototype duty. However, after some innovative thinking and negotiation, junior officers are now more easily afforded the opportunity to take advantage of a follow-on graduate education program. Shift engineers are eligible for the program after two years of duty. In exchange for a commitment to attend Submarine Officer Advanced Course (SOAC), the officer is granted up to 12 months additional time at prototype to pursue a graduate degree of his choice. Under this program I was able to attend RPI's Lally School of Management & Technology as a full-time student, with my studies fully funded by the separate Graduate Education Voucher (GEV) program. While many of my friends were resigning their commissions in order to attend business schools and get acclimated with civilian industry, I studied corporate strategy and finance in a classroom of students at equivalent junctures in their civilian careers. I studied, debated, and worked in teams with students from five continents. From these classes and the JPME Phase I coursework, I built an extensive toolbox concerning organizational behavior, decision making, and motivation in civilian and military organizations.

Returning to prototype for shore duty opens the doors to a much larger world than I knew from the confines of my old study cubicles as an ensign. I realize that prototype duty is not for everyone, but the depth and breadth of personal and professional experience in this tour has been a truly rewarding personal experience.

Lt. Latta is starting the Submarine Officer Advanced Course this fall. He served as a division officer on board *USS Wyoming (SSBN-742)* (BLUE) in Kings Bay, Ga.



SUBMARINE BALLS AROUND THE COUNTRY



Each year, U.S. submariners and their guests from across the country and around the world take a night to celebrate the Submarine Force. Enlisted sailors and officers relax and celebrate their accomplishments over the year.

Below are pictures from these different balls.





Submarine Museums and Memorials



Courtesy of the Submarine Force Museum

USS *Nautilus* (SSN-571)

Thames River, Groton, Conn.

The Submarine Force Museum, located on the Thames River in Groton, Conn., maintains the world's finest collection of submarine artifacts. It is the only submarine museum operated by the U.S. Navy, and as such is the primary repository for artifacts, documents and photographs relating to U.S. Submarine Force history. The museum traces the development of the "Silent Service" from David Bushnell's *Turtle*, used in the Revolutionary War, to *Virginia*-class submarines.

Originally established as "The Submarine Library" by Electric Boat Corporation in 1955, the Submarine Force Library and Museum soon gained respect for its archival and research value. In April, 1964, the entire collection was donated to the Navy and relocated to the Naval Submarine Base, New London, Groton, Conn. The name "Submarine Force Library and Museum" was officially adopted in 1969.

The museum's collections include more than 33,000 artifacts, 20,000 significant documents and 30,000 photographs. The 6,000 volume reference and research library is a world-renowned collection relative to the history of U.S. submarines and is open to anyone looking for information on submarines or submarine history. The museum is also home to the world's first nuclear-powered submarine, the USS *Nautilus* (SSN-571).

In July of 1951, Congress authorized construction of the world's first nuclear powered subma-

rine. On December 12th of that year, the Navy Department announced that she would be the sixth ship of the fleet to bear the name *Nautilus*. Her keel was laid by President Harry S. Truman at the Electric Boat Shipyard in Groton, Conn., on June 14, 1952.

After nearly 18 months of construction, *Nautilus* was launched on Jan. 21, 1954 with First Lady Mamie Eisenhower breaking the traditional bottle of champagne across the sub's bow as she slid down the ways into the Thames River. Eight months later, on Sept. 30, 1954, *Nautilus* became the first commissioned nuclear powered ship in the U.S. Navy.

On the morning of Jan. 17, 1955, *Nautilus's* first commanding officer, Cmdr. Eugene P. Wilkinson, ordered all lines cast off and signaled the memorable and historic message, "Underway On Nuclear Power." Over the next several years, *Nautilus* shattered all submerged speed and distance records.

In the spring of 1979, *Nautilus* set out from Groton, Conn., on her final voyage. She reached Mare Island Naval Shipyard, Vallejo, Calif., on May 26, 1979—her last day underway. She was decommissioned on March 3, 1980 after a career spanning 25 years and over half a million miles steamed. *Nautilus* arrived at the Submarine Force Library and Museum on April 11, 1986.

www.ussnautilus.org